

Taking Stock of Antidumping, Safeguards, and Countervailing Duties, 1990–2009

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Abstract

This paper examines the evolving, cross-country use of antidumping, safeguard, and countervailing duty policies—temporary trade barriers (TTBs)—over the period 1990–2009. The author constructs two new measures of imported products subject to the combined use of these TTBs before applying these measures to new data drawn from the World Bank’s Temporary Trade Barriers Database. The research establishes a number of facts regarding trends in historical use to benchmark against policy activity during the global economic crisis of 2008–2009. The 2008–2009 economic shock mostly accentuates patterns and trends already visible in the pre-crisis data: e.g., while the major users of such policies

overall combined to increase the product lines subject to TTBs by 25 percent during the crisis, this was driven almost entirely by developing economies which increased their product coverage by 40 percent. On the export side, a previously unidentified feature of the data is that a much larger share of China’s exports to other developing economies is subject to foreign-imposed antidumping than its exports to developed economies. The evidence confirms this feature is shared by a number of other major developing economy exporters, deepening concern that these discriminatory trade barriers are increasingly a “South-South” phenomenon.

This paper—a product of the Trade and Integration Team, Development Research Group—is part of a larger effort in the department to understand the changing nature of market access in the world trading system. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at cdown@worldbank.org.

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1. Introduction

The major economies of the world trading system undertook a variety of approaches to liberalize trade during the 1985 – 2009 period. *Multilateral* negotiations resulted in the initiation and completion of one round (Uruguay Round, 1986-1994) which transformed the GATT to the WTO, and WTO members subsequently initiated further liberalization negotiations in 2001 under the (still ongoing) Doha Round. A number of countries liberalized by negotiating and/or expanding access to partners through major *preferential* trade agreement initiatives: examples include the Canada-U.S. Free Trade Agreement (CUSFTA) that was signed in 1987 and then extended to include Mexico in 1994 to create NAFTA, and Argentina and Brazil negotiated with other South American countries to form Mercosur in 1991. The European Community expanded from 10 countries to 12 in 1986 to 15 in 1995 to 25 in 2004 to 27 members of the European Union by 2007, and it also formed a customs union with Turkey that went into effect in the mid-1990s. India responded to its balance of payments crisis of 1991-1992 by cutting its applied tariffs through a *unilateral* liberalization. Finally, China underwent fifteen years of *accession* negotiations to realize WTO membership in 2001, and this locked in a number of its major tariff reductions. Regardless of the trade liberalization path undertaken, a common result is that many of these economies currently have historically low applied import tariffs in place.

While major WTO economies pursued different liberalization routes to reduce and sustain lower applied tariffs over these 25 years, a second theme common to this period is that many increasingly adopted “contingent” or “administered” import protection under policies such as antidumping, safeguards, and countervailing duties – what I refer to jointly as “temporary trade barrier” (TTB) policies. The combined result of these two phenomenon is a new framework for the international trading system: exporters are simultaneously subject to low applied import tariffs on average but they also face the threat of frequently changing – i.e., newly imposed or removed – TTBs. Such an institutional framework ultimately poses many research questions on transmission mechanisms through which government access to and use of TTB policies are economically important.

This paper characterizes this framework by providing an empirically-based set of facts on the cross-country use of TTB policies over 1990-2009, taking stock of newly available, product-level data organized into the World Bank’s *Temporary Trade Barriers Database* (Bown, 2010a). I begin by using the data to address a number of basic questions. For which countries and in what episodes are such TTB

policies revealed through their use as being quantitatively important?¹ How were these TTB policies used and not used during the global economic crisis of 2008-2009? What is the exporter-incidence of such imposed policies and how has this changed over time?

In section 2 I first define and construct two new measures of annual, product-level stocks and flows of imported products subject to these TTBs to address some of the main shortcomings of previous research. First, prior research has typically been unable to construct comprehensive estimates for how much of a country's imports were subject to TTBs at any point in time. Examining the "stock" of such trade barriers in place over was previously difficult due to the lack of data on both policy removals and the details of which Harmonized System (HS) imported products the new and previously imposed TTBs were affecting. As such, previous work focused almost exclusively on industry-defined data covering annual counts of the initiation of *new* investigations and the imposition of *newly imposed* barriers – "flow" variables that also lacked a normalized (economics-based) definition for what constituted a "product." My measures overcome these difficulties through application to new and detailed data drawn from the World Bank's *Temporary Trade Barriers Database*. As such, it builds upon prior work documenting the global proliferation of antidumping (AD) use in particular (Prusa, 2001; Zanardi, 2004).

My first result is that there is significant heterogeneity as to the potential economic impact that developed versus developing economy TTB policies have on their trade flows. Most striking is how the divergence between these two groups of policy-imposing economies is taking place over time.² Even before the global economic shock of 2008-2009, the annual stock of imported products subject to such trade barriers imposed by major emerging economies such as Argentina, Brazil, China, India and Turkey

¹ There is also the possibility that such policies are important even despite non-use (or under-utilization) – e.g., as an outside option or off-the-equilibrium path behavior – if they help facilitate efficiency-enhancing outcomes. For example, access to (but non-use of) such policies may serve as insurance for uncertain trade policy negotiators which allow them to take on deeper commitments in a trade agreement than they might otherwise undertake without access to such "exceptions" (Fischer and Prusa, 2003; Hoekman and Kostecki, 2009). I return to this below in the context of one of the questions raised by the pattern of new TTBs resulting from the shock of the global crisis of 2008-2009.

² These results relate to recent research (Vandenbussche and Zanardi, 2010; Egger and Nelson, forthcoming) which uses more historical, albeit less-detailed, data to estimate the aggregate impact of antidumping – the most common of these TTB policies – on trade flows. These two papers use similar gravity model regression approaches and present distinct results: while both find the effect of antidumping on trade flows to be negative, Egger and Nelson conclude that the effect is modest while Vandenbussche and Zanardi interpret the effect as more sizable. A separate approach to estimating the impact of these policies is Gallaway, Blonigen and Flynn (1999), which develop a computable general equilibrium (CGE)-based approach to estimate the economic welfare impact of the U.S. use of antidumping and countervailing duties on data for 1993.

had grown substantially; from a starting point in the mid-to-late 1990s at or close to zero, to coverage of up to 4% of each economy's imported products by 2007. On the other hand, more developed economies with a longer history of using such policies, like the U.S. and EU, have experienced a declining share of their imports subject to such policies over time. One of my measures indicates that while 3.5% - 5% of these economies' imports may have been covered during the 1997-2005 period, TTB policy coverage had fallen by roughly 50% to only 1.5% - 3% of their annual imports by 2007.³

After providing a broad characterization of the use of these policies across countries over time, the next main empirical contribution is to use the data and my methodological framework to assess how the level and composition to the stock of TTBs changed during the economic shock of the global crisis of 2008-2009. Especially early in the crisis, and perhaps due to the sharp and unexpected decline in global trade flows in the fourth quarter 2008 through the first quarter 2009, there was substantial concern of a protectionist retreat on the scale of the 1930s Great Depression era.⁴ Nevertheless, in section 3 I detail the somewhat surprising evidence that the 2008-2009 shock basically continued pre-crisis trends in the ways both developed and developing economies apply new import protection via TTBs. While the major G20 users of such policies have combined to increase the stock of product-lines subject to TTBs by 25% during the crisis, and despite the massive recessions in many high-income economies, on average developed G20 economies increased the stock of products covered by TTBs by only 5% in 2009 relative to the pre-crisis level. On the other hand, developing economies have increased their stock of product coverage by TTBs during the crisis by 40%, though there is substantial heterogeneity within the set of developing economies as well. Nevertheless, my results suggest it would be wrong to interpret this

³ As I explain in substantial detail in section 2.1 below, despite methodological innovations to measuring the economic importance of such TTBs, the remaining data constraints do leave some inevitable issues of measurement error when it comes to the construction of the *level* of any policy-imposing economy's imports subject to TTBs. Nevertheless, because I define the measures consistently over time and across trading partners, measurement error is much *less* of a concern for two of our main questions of interest: *intertemporal* changes (i.e., whether the scope of imported products subject to a country's use of TTBs is increasing or decreasing over time) and the relative *exporter incidence* (i.e., whether certain exporters are relatively more or less frequently targeted than others by imposed TTBs).

⁴ For a comprehensive account and decomposition of the various protectionist forces at work during the Great Depression, as well as other, non-trade policy related factors that contributed to the curtailment of global trade, see Irwin (forthcoming). For an early assessment of potential causes of the trade collapse of 2008-2009, of which the consensus is that it had little to do with changes in trade policy but instead more fundamental demand (income) and supply (credit) factors, see Baldwin (2009). Baldwin and Evenett (2009) provide a collection of research from early in the crisis that highlights the fears of an impending protectionist backlash.

increase as *caused by* the crisis, given the measured increase is consistent with pre-crisis trends and one not far from forecasts of what may have taken in place even in the absence of the crisis.⁵

My second main contribution of the paper is to provide a thorough measurement of the exporter incidence of the growing use of antidumping and its implications for discriminatory patterns of import protection across the trading system. Section 4 provides evidence of substantial heterogeneity; this time across affected exporting economies. Over time, the main impact of the foreign use of antidumping is increasingly on developing economy exporters. First, China's exported products face the largest stocks of foreign-imposed antidumping barriers, at nearly four times the amount of the second most-targeted economies – South Korea; EU; Taiwan, China – more developed economies whose stocks of exports affected by foreign antidumping have remained relatively stagnant over recent history. Overall, in 2009, 2.6% of China's exported products to developing economies were subject to antidumping and 1.6% of its products to developed economies were subject to antidumping, percentages that have accelerated since its 2001 WTO accession (Messerlin 2004, Bown, 2010c). I illustrate additional data that shows this feature of antidumping as increasingly a "South-South" phenomenon is not unique to China's exports. A number of other developing countries face trends similar to China in that the share of their products exported to other developing economies that is targeted by foreign antidumping is higher than the share of their products exported to high income economies.

In addition to these two main empirical contributions, my approach allows us to address a number of other important questions raised by the data. For example, while focusing on annual stock measures of TTBs is an important and previously underemphasized area for research, my approach also allows for construction of other measures of TTB policy activity, including more precise "flow" measures based on product coverage. Capturing more information on the rate of new application of such barriers over time can better speak to the volatility of trade policy and important questions regarding policy uncertainty now emerging in the literature (e.g., Limão and Handley, 2010). While there is substantial variation in flows, in section 2 I also find that some major economies average 0.5% to 1.0% of imported

⁵ It is arguably not too early to begin to assess the stock of TTBs resulting from the crisis period given that increased flows of new investigations have shown signs of leveling off by the end of 2009, and my measurement of TTBs will account for flows and it will "time" the contribution to the stock of newly imposed TTBs as the year the first (even a preliminary) barrier is imposed. As of the latest Temporary Trade Barriers Database released in July 2010 (covering data through second quarter (2Q) 2010), there had been a substantial moderation in the count of newly initiated TTB investigations relative to the run-up that took place in 2008-2009. The count of new investigations began to taper off in 4Q 2009, and this has continued into 1Q and 2Q 2010. See, for example, Bown (2010b).

products becoming subject to new TTB investigations annually. Furthermore, there is also evidence that the flows relate to the *cumulative* stocks of 6-digit HS products affected by at least one TTB over the 1990-2009 period. My examination of the data suggests that for the major G20 economies the cumulative stock of affected products ranges from a low of 0.09 percent (Japan) to a high of 21.79% (Mexico), with India (8.62%), European Union (9.62%) and United States (13.37%) in the middle. The data suggest that the uncertainty created by the volatility in some economies' use of TTBs is a policy feature quite distinct from how most of these economies use their applied tariffs, at least during the 2000s, which have remained relatively unchanged given their multilateral (WTO) and preferential trade agreement commitments.

Next, I also investigate the potential for substitutability across antidumping, countervailing duty, and safeguard policies within these policy-using economies; as such, I attempt to disentangle the relative importance of each policy across countries and time.⁶ For example, in addition to the global safeguard (SG), I include data on post-2001 use of the "China-safeguard" (CSG) – a policy that the existing WTO membership insisted upon as part of China's accession to the WTO and that may be imposed until 2014. The most prominent use of this policy was the high-profile U.S.-imposed safeguard on imports of Chinese tires in the midst of the global crisis in September 2009. Overall, evidence from section 2 allows me to conclude that while antidumping is still the dominant TTB policy instrument, an exclusive focus on antidumping could miss up to 40% (depending on policy-imposing economy) of the cumulative stock of products affected by TTBs during this period; though most of this is with respect to the *global* safeguard policy instrument.

Third, in section 5 I provide a final examination of the more recent potential shift toward governments relying on the countervailing duty (anti-subsidy) policy. Such a change in the policy environment stems from at least two separate events: the rules and commitments accompanying China's WTO accession in the face of its continued export expansion; and the global policy response to the economic crisis of 2008-2009 which led to a number of government-financed industry bailouts which trading partners may ultimately choose to address through countervailing duties (CVDs).⁷ I decompose

⁶ Examples of recent research examining use and other impacts of antidumping across (including developing) countries includes Niels and Francois (2006), Bown (2008), Reynolds (2009), Moore and Zanardi (2009), and Bown and Tovar (forthcoming). Finger and Nogues (2005) present a set of case studies examining the Latin American trade liberalization experience and the relationship with these economies' access to TTBs.

⁷ Shifting policy emphasis is certainly not new to this period. Indeed in the 1960s and 1970s, before the movement toward application of antidumping duties, some countries negotiated voluntary export restraints (VERs) to impose new trade barriers outside of the confines of applied tariffs. In the case of the United States, a number of these

the data and illustrate that CVD use is still largely dominated by the United States, though I point to how this may change over time. I also illustrate how assessing the impact of countervailing duties is complicated by the fact that almost all applications in recent history have been made simultaneously with antidumping duties (against the same products, from the same foreign sources), though this too may change. The evolving nature of antidumping, countervailing duty, and safeguard protection has obvious political economy implications for which countries are interested in negotiating potential reform to the WTO Agreement on Antidumping, as well as the Agreements on Subsidies and Countervailing Measures, and Agreement on Safeguards.

I conclude the final section by using the facts that the data reveal to raise new and pressing questions for further economic research on TTB use and the evolving rules, changing nature of the WTO membership, shifting global trade patterns, interaction with preferential trade arrangements, and even the fragmentation of global production.

2. The Stock of Temporary Trade Barriers – from the Importing Economy Perspective

My first task is to construct measures for the use and potential impact of the TTBs over time and across policy-using countries. My attempt is to improve upon earlier efforts (Prusa, 2001; Zanardi, 2004; Bown, 2009) to characterize the use of such trade barriers across countries over time. Previous work generally suffers from two data-induced shortcomings. First, it typically relies on the country's own, self-reported characterization of a "product" subject to a newly initiated investigation or imposed barrier, and this definition of a product results from the petition filed by the domestic industry. There is no uniform standard for such definitions, as such using this unit of account may not accurately reflect the economic importance or unimportance of TTBs if there is substantial heterogeneity in the amount of product coverage across TTB investigations, countries, or time. Second, previous work also focused almost exclusively on data covering annual counts of the initiation of *new* investigations and the imposition of *newly imposed* barriers – i.e., "flow" variables. Such research has typically not had access to sufficiently informative data so as to construct and examine the "stock" build-up of such trade barriers in place over

came after initiation of escape clause actions under Section 201 of the U.S. trade law; i.e., the manner through which the United States implemented its actions so as to be consistent with the GATT 1947's safeguard provisions of Article XIX.

time because it lacked information on policy removals.⁸ Constructing and examining stock measures also allows me to better assess the incidence of TTBs in the face of heterogeneity in the timing of newly imposed barriers and the length of time that such barriers stay imposed.

My approach takes advantage of extremely detailed data from the World Bank's *Temporary Trade Barriers Database* (Bown, 2010a) in order to construct relatively comprehensive information on the "stock" and "flow" of such barriers at the 6-digit Harmonized System (HS) product level across countries and over time. I begin by focusing on the share of imported products at the HS-06 level ("counts") before comparing this with a second, complementary ("values") approach which relies on HS-06 (non-oil) import value data from the United Nations *Comtrade* database to construct year-by-year coverage ratios of imports subject to TTBs. More details on the underlying data are available in the Appendix and are described comprehensively in Bown (2010a).

2.1 Methodology

My first methodological approach takes an importing economy's set of HS-06 products as the unit of observation. I build from Bown and Tovar (forthcoming, figure 1) which focused on India's use of antidumping over the period 1992-2003 to construct count measures of the annual stock of HS-06 products subject to Indian antidumping, thus reflecting information on newly imposed trade barriers, previously imposed trade barriers, and the removal of previously imposed barriers. In addition to applying the Bown and Tovar approach to a new set of countries, I also adapt it along three important dimensions: i) I examine not only cumulative stocks but also flows; ii) I examine not only antidumping, but also HS-06 products subject to other TTB policies such as countervailing duties, global safeguards, and China-specific safeguards; and iii) I normalize the count of affected HS-06 products by the economy's stock of HS-06 products with non-zero imports in that year.

More formally, let k be the policy-imposing (importing) economy and let $m_{i,t}^k \in \{0,1\}$ be an indicator for whether the economy had non-zero imports of product i in year t . The HS-06 product i is in the economy's time-varying set of HS-06 products with non-zero imports, defined as I_t^k . Next let $b_{i,t}^k \in \{0,1\}$ be an indicator for whether the importing economy k "applies" a temporary trade barrier

⁸ Exceptions include recent research examining the question of antidumping policy removal and the Sunset Review process stemming from the Uruguay Round Agreements such as Moore (2006) and Cadot, de Melo and Tumurchudur (2007).

on imports of product i in year t . Thus I define my first “count” measure of the share of annual stock of economy k imported products subject to a TTB as

$$\frac{\sum_{i_t^k} b_{i,t}^k m_{i,t}^k}{\sum_{i_t^k} m_{i,t}^k}. \quad (1)$$

As will become clear below, I rely on a variety of definitions for the temporary trade barrier indicator $b_{i,t}^k$. I may define it as an indicator of the initiation of a TTB *investigation* of product i in year t ; alternatively I may define $b_{i,t}^k$ as the actual application of a barrier (e.g., import duty, quantitative restriction, price undertaking) imposed over product i in year t . Note that when referring to applied barriers I take the year of imposition as the first year that the barrier was imposed, even if it was only a preliminary barrier and even if that preliminary barrier was subsequently removed after completion of the full investigation. The application of even preliminary barriers can affect trade both directly (raising costs to exporters) and indirectly (increasing uncertainty about future policy).

My second approach refines equation (1) by replacing the binary indicator variable for imports, $m_{i,t}^k$ with product-level, value of import data and thus *trade-weighting* the $b_{i,t}^k$ indicator. This allows me to address the likelihood of substantial heterogeneity in the economic importance across HS-06 products and temporary trade barriers. For example, not all HS-06 products may be equally important contributors to the economy’s overall level of imports; one product from one foreign source may cover billions of dollars of imports while another may only cover a few hundred thousand dollars. Furthermore, some temporary trade barriers are applied against multiple foreign sources and thus have the possibility of adversely affecting much more trade than one applied against a single foreign supplier of the HS-06 product. My second approach is to construct annual stock and flow measures of imports affected by TTBs in a way that is weighted by the HS-06 product-level value of imports, $v_{i,j,t}^k$. While I build from equation (1), I adapt the first approach in three ways.

First, I can now redefine my product-specific, time-varying temporary trade barrier indicator to now be at the *bilateral* level: let $b_{i,j,t}^k \in \{0,1\}$ be an indicator for whether a temporary trade barrier applies to the economy k imports of product i from exporter j in year t . This modification allows me to address the possibility of heterogeneity across foreign sources in terms of which trading partners are negatively affected by the TTB and which are not.

The second adaptation requires a slightly more detailed explanation. In order to ultimately create coverage ratios that are comparable within a country *over time*, I must make an assumption on the counterfactual level of economy k imports in t (as well as $t + 1$, etc) from a supplier j whose exports had been subject to a TTB imposed in an earlier year (e.g., $t - 1$, $t - 2$, etc) and thus which did not grow at a “normal” rate in later years (e.g., t , $t + 1$, etc). To determine the counterfactual level of imports for such products, I make the simple and conservative assumption that yearly imports of TTB-impacted products would have grown *at the same rate* as the economy’s non-TTB impacted products.⁹

To make this clear, I decompose the set of economy k imported products I^k into two subsets. Define

the first subset as \hat{I}^k and allow it to contain those HS-06 products i subject to a TTB imposed during the sample and for which I need to construct *counterfactual* import values, defined as $\hat{v}_{i,j,t}^k$, for all subsequent years that the temporary trade barrier is in effect. I define the second subset of products as I^{*k} and allow it to contain all (other) imported HS-06 products i which were never subject to an imposed TTB and for which I do *not* need to construct counterfactual import values, and thus for which I can rely on the observable import data $v_{i,j,t}^k$.¹⁰

The third modification to equation (1) addresses the well-known concern that any TTB policy imposed in year t may reduce the (contemporaneous) year t value of imports, and this would underweight the economic importance of the trade barrier in the averaging. I therefore interact the indicator for a year t temporary trade barrier with the value of imports from j in the *previous* (pre-trade barrier) year $t - 1$, i.e., $v_{i,j,t-1}^k$.

⁹ There are arguments to suggest such products may grow at a rate different from other products in the economy. For example, these are products that typically had been growing at rates faster than the average rate of import growth, perhaps because of a technological innovation or productivity improvement, and thus one might expect that to have continued. On the other hand, if the imports were growing at faster rates because they were dumped or subsidized (and if the dumping or subsidization had terminated), one might expect the rate of growth to fall (if the dumping or subsidizing stopped), even in the absence of the TTB. While acknowledging the range of theoretical arguments for counterfactual import growth, to construct these measures I rely on the conservative assumption of TTB-impacted imports growing at the same rate as imports not impacted by TTBS.

¹⁰ I use the mean annual growth rate of products from the set I^{*k} in t to construct the counterfactual import levels for the products in \hat{I}^k in t , which I denote $\hat{v}_{i,j,t}^k$.

My second measure of the share of annual stock of economy k imported products subject to a TTB in year t , reflecting the three modifications to equation (1) and thus weighted by the “value” of imports, is defined as

$$\frac{\sum_{I_t^k} b_{i,j,t}^k v_{i,j,t-1}^k}{\sum_{I_t^k} v_{i,j,t-1}^k + \sum_{I_t^{*k}} v_{i,j,t-1}^k} . \quad (2)$$

There are at least three other and more subtle transmission mechanism through which (1) and (2) can diverge in addition to the ways through which I have already identified trade-weighting the HS-06 products as leading to differences between series resulting from equations (1) and (2). First, defining the series according to the stock of covered HS-06 products prevents the case of a product already subject to a TTB in $t - 1$ from being double counted if a new TTB is imposed over the same product in subsequent years (e.g., in year t). For example, suppose a HS-06 product from a given foreign trading partner became subject to an AD barrier in $t - 1$ and then a CVD in t . Since I am measuring the “stock” of products affected by TTBs, this would not result in a change to series (1) or (2) between $t - 1$ and t . On the other hand, if there is a *new* trading partner being subject to the TTB between $t - 1$ and t , even if the underlying product is unchanged, there can be a change in series (2). A change in trading partner coverage could occur because either the second partner was targeted under a different underlying TTB policy instrument (e.g., AD vs. CVD) or because of differences in the timing under the same policy instrument (e.g., the first AD imposed over the HS-06 product was imposed against country A in $t - 1$ and not against country B until t). Third, the stock series can also be affected through differential timing in the *removal* of a previously-imposed TTB over the same HS-06 product. For example, if the TTB on trading partner A is removed in $t - 1$ but the TTB on trading partner B is not removed until t , this differential timing in the removal will affect series (2). However, there will be no change in series (1) until *all* previously-imposed TTBs affecting this product are removed.

I conclude this section with a discussion of four remaining caveats to my approach.

First, some economies impose TTBs at a level of product disaggregation (e.g., HS-08, HS-10) that is finer than the HS-06 level that is my focus. Nevertheless, examination at the HS-06 level is desirable for our context, since HS-06 is the finest level of disaggregation that is both comparable across countries and with available import value data over the 1990-2009 period. While the application of measures using HS-06 data will overstate the trade impact (in the level) for any economy that typically does not cover all sub-products within an HS-06 category, because my measures are defined consistently over

time and across trading partners, measurement error is much less of a concern for two of our main questions of interest addressed below: *intertemporal changes* (i.e., whether the scope of imported products subject to a country's use of TTBs is increasing or decreasing over time) and the *relative exporter incidence* (i.e., whether certain exporters are relatively more or less frequently targeted than others by the stock of imposed TTBs).

Second, my approach concentrates entirely on the potential first-order impact of TTBs on trade. There is a substantial theoretical and empirical literature from case studies that identifies potentially important second-order effects of TTBs (especially antidumping) on trade flows. Some accentuate the potential negative trade effects beyond what I identify here, while others are offsetting and reduce the overall size of the trade effects.¹¹

Third, even trade-weighting the incidence of TTBs does nothing to address heterogeneity in the size of the imposed trade barriers. Bown (2010c), for example, notes substantial heterogeneity in the size of duties imposed across both policy-imposing economies and across targeted exporters by (within) a policy-imposing country, especially with respect to barriers imposed on imports from China.

Fourth, I also do not address potential heterogeneity to the *form* of the applied TTBs. For example, some economies apply antidumping as ad valorem duties, others may be more likely (or against certain trading partners or over certain imported products) to apply it as a specific duty or a 'price undertaking' in which the exporter voluntarily raises its price above some threshold under the threat of an imposed duty. Global safeguards, on the other hand, are frequently applied as quantitative restrictions such as tariff rate quotas.¹²

¹¹ Excellent surveys of the antidumping literature that review these effects include Blonigen and Prusa (2003) and Nelson (2006). Examples of accentuating effects include downstream impacts, tariff-jumping foreign direct investment, and retaliation, while examples of offsetting effects include trade diversion. For a recent discussion and a relatively comprehensive list of such effects, see Vandenbussche and Zanardi (2010).

¹² I also do not address the issue of the likely import demand or export supply responses to the imposed TTBs, because I do not control for import demand or export supply elasticities as in the Overall Trade Restrictiveness Index (OTRI) approach of Kee, Nicita and Olarreaga (2008, 2009). For an application of the OTRI to the global economic crisis of 2008-2009, see Kee, Neagu, and Nicita (2010).

2.2 Potential trade impact from the importing economy perspective

Before turning to the results, I describe how to interpret the data presented in figures 1 and 2. Each row presents information for one policy-imposing economy. The panels in the left column (figures 1a and 2a) present information based on equation (1) which uses “counts” of HS-06 products, and thus minimal assumptions tying product coverage to trade impacts. The panels in the right columns (figures 1b and 2b) rely on equation (2) to create a trade-weighted measure of time-varying coverage ratios by matching HS-06 products to import “value” data. The series in panel a begins in 1990. The series in panel b covers TTB activity beginning in 1991, since equation (2) requires import value data for $t - 1$, and my first year of available import data for most economies is only 1990.¹³

Each of the panels in figures 1 and 2 presents four different pieces of information based on four different definitions for the TTB indicator variable $b_{i,t}^k$ (panel a) or $b_{i,j,t}^k$ (panel b). First, the gray line defines the TTB indicator based on imported products affected by newly initiated *investigations* under *any* TTB policy and thus is a broad measure of the potential annual “flow” of new barriers.¹⁴ Second, the gray *dashed* line defines the indicator similarly, but it captures the flow of potential imported products affected by the *antidumping* policy alone. For countries that only used antidumping and did not have any CVD, SG or CSG investigations during this period, the gray solid line and the gray dashed line are overlapping. Any divergence between these two lines represents the products subject to investigations under the countries’ other (non-antidumping) TTB instruments. Third, the *black solid* line defines the TTB indicator as taking on a value of 1 whenever the product (panel a) or product-trading partner combination (panel b) was subject to some TTB that had been imposed in that year or a prior year (and had not yet been removed); as such this measures the “stock” of products subject to TTBs. Fourth, the *black dashed* line represents the stock of products subject to only the antidumping policy.

¹³ The exceptions are listed in the Appendix.

¹⁴ This series represents the *potential* new product coverage because not all resulting investigations necessarily result in the imposition of a new trade barrier. I use this definition given the results of Staiger and Wolak (1994) which noted how even the mere investigation can have real economic effects. Thus the “flow” level can be higher than the incremental addition to the “stock” given that not all investigations will result in imposed barriers. For an example of this, see the “count” measures for Brazil in figure 2a and the years 1993 (investigations = “flow”) and 1994 (new barriers = “stock” imposed one year later).

2.2.1 Developed economy imposers of TTBs

Begin with the panels of figure 1, which illustrate the results for the main developed G20-economy users of TTBs.¹⁵ Consider the case of a policy-imposing country like the United States.¹⁶ The consistency of the data on the use of TTBs with broad macroeconomic trends is visible in both panel 1a and panel 1b; with spikes in flows (and increases to stocks) taking place in the 1990-91 recession, in response to the 1997-98 Asian crisis which saw surges in imports, and in the 2001-02 recession.¹⁷ Over time, most of the products subject to a U.S. TTB have been affected by (at least) the antidumping policy; the major exception is the 2002-2003 period during which a large number of imported steel products were not subject to antidumping but a global safeguard. During the 1997-2007 period, the share of annual HS-06 U.S. imported products subject to a TTB peaked at slightly more than 6%, though the peaks took place in different years depending on whether the measurement is by *counts* of products (2003) or the trade-weighted *value* of imports (2001). This divergence between the stock series of products subject to all TTBs in figure 1a versus figure 1b implies that while the (net) count of HS-06 products subject to U.S.-imposed TTBs increased between 2001 and 2003, the products for which the TTBs were being *removed* during 2001-2003 were a much larger share of the value of overall U.S. imports than the products for which new TTBs were being imposed.¹⁸ Finally, it is worth noting that according to both modes of measurement, the share of imports subject to U.S. TTBs is substantially lower in 2007 than it was during its peak of the 1997-2007 period. Using the *value* approach in particular, 2.33% of imports were covered in 2007 as compared to a 2001 peak of 6.14% of imports. The timing of the decline starting from that

¹⁵ In addition to the fourteen TTB-using G20 economies that I discuss below, I have also constructed TTB measures for more than 20 other policy-imposing economies with data available in the Temporary Trade Barriers Database. Because of space constraints I do not report on them here but instead focus primarily on the G20 economies as users and (in section 4 below) the exporters that ship products to the G20 import markets.

¹⁶ Another item to note for the U.S. is that it had been using these policies (antidumping in particular) prior to 1990, and thus there is an underlying stock of products affected by these policies that I am not capturing, since I am starting with barriers first imposed in 1990. (This is due to consistency of access to import classification under the Harmonized System which took hold across countries only in 1988). This will also apply to Australia, Canada, and the European Union who each had a substantial stock of antidumping barriers in place by the time the HS system started in 1988.

¹⁷ This is consistent with other research linking antidumping use, in particular, with business cycle fluctuations such as changes in real GDP and currency movements. See Knetter and Prusa (2003).

¹⁸ Again, following the discussion of equation (2), the share of imports for products that had been subject to a previous TTB that was being removed would be based on what the product's share of the U.S. import market had been prior to the TTB first being imposed.

peak roughly coincides with the period at which the Uruguay Round Sunset Review provisions were starting to take effect.¹⁹

[FIGURE 1 HERE]

Consider next some of the other developed economy imposers of TTBs illustrated in figure 1. First, compared to the United States, each of the other developed economies generally has lower *levels* of stocks of imported products subject to TTBs during the sample period. Amongst the developed economies, the European Union has the second-highest annual stock of products covered by TTBs on average, and its use tracks the data for the United States in terms of broad macroeconomic trends in the stock of product coverage, and the decline in recent years of products subject to TTBs. Furthermore, most of the products subject to EU TTBs are affected by antidumping; similar to the United States, the major exception is the 2002-2003 period in which a larger number of steel products were subject to a global safeguard.

With respect to the other major developed economies, historical users of antidumping such as Australia and Canada have also experienced a downward trend in the share of their imported products subject to TTBs during this period, with the exception of 2008-2009. South Korea is a relatively new user, though the stock of imported products subject to its TTBs has increased moderately over time. The least active TTB user amongst the set of G20 developed economies during this period is Japan. Japan had an extremely small number of its imported products (panel a) subject to TTBs; nevertheless, when trade-weighting at the HS-06 level, as in panel b, the 2006 imposition of countervailing duties against imported semiconductors (DRAMs) from South Korea has covered a significantly larger fraction of imports.

The lower half of table 1 summarizes the stock information across the economies illustrated in figure 1. The economies are ordered according to their *value* share measure of imports covered by the stock of TTBs in effect in 2009 (column 3, from equation (2)). The table also reports data on the raw count of HS-06 products subject to TTBs in 2009, the *count* share measure of equation (1) for 2009, the annual average for 1997-2007 of imports affected using equation (1) and (2), and the minimum and

¹⁹ Under Article 18.3.2 of the Uruguay Round's Antidumping Agreement, for sunset purposes an AD barrier imposed prior to 1995 was deemed to have been imposed on the date of entry into force of the Antidumping Agreement (1 January 1995). Thus by the end of 1999, the United States had to initiate sunset reviews on all barriers imposed prior to 1995 that were still in effect in 1999. Presumably a number of these reviews were completed during 2000-2002, and when combined with the normal removal of barriers imposed after 1995, this led to sharper reductions in the "stock" of products subject to antidumping in particular (especially using the "value" measure) after 2000-2002.

maximum *value* share measures (using equation (2)) during that period. In order to interpret the *count* of HS-06 products, note that there are slightly more than 5,000 HS-06 product categories in existence in any one year in the sample. While most of the developed economies and many of the developing economies had non-zero imports of close to 100% of all products in all years, this is not universally the case. India, for example, began the 1990s by importing only around 68% of all HS-06 product categories, before that steadily increases to 90% and above by 2001.

[TABLE 1 HERE]

2.2.2 Developing economy imposers of TTBs

Figure 2 presents information in the same form as figure 1 but with respect to the G20 *developing* country users of TTBs. The broad pattern of developing economy-imposed TTBs over this time period is much different from the developed economy users.

[FIGURE 2 HERE]

Consider first a major emerging market like India. In response to its balance of payments crisis of 1991-1992, India entered a stand-by arrangement with the IMF in which one of the conditions was a substantial unilateral reduction of its applied import tariffs over the 1992-1997 period. According to widely used measures that rely on counts of the number of newly initiated investigations or imposed barriers (thus without normalizing for product coverage or the economic importance of imports), India has become the WTO system's most frequent user of policies like antidumping and the global safeguard. India first started using antidumping in 1992, but by 1997 it began to accumulate sizable stocks of products under TTBs (primarily antidumping) according to my two measures illustrated in figure 2a and 2b. The stock of affected products continued to increase through the 2000s, and by 2009 India had a stock of TTBs in place that covered 6.09% (2.94%) of its imports according to the count (value) measure. And while India is now a user of each of the four TTB policy instruments – it has filed the most antidumping, global safeguard, and China-specific safeguard investigations during this period, and it filed its first CVD investigation in 2009 – figure 2 also illustrates that antidumping has been the instrument that has affected the majority of products impacted by India's total use of TTBs.

Other emerging economies such as Argentina, Brazil and Turkey have similar patterns to their data on TTB product coverage over time. For Argentina and Brazil, there is a general upward trend in the stock of imported products subject to TTBs after they undertook preferential (reciprocal) trade

liberalization embodied in the Mercosur agreement in the early 1990s. There are also upward spikes in flows (and stock accumulations) around 2000 that correspond to the Argentine financial crisis and currency devaluation. For these two countries, there is also evidence of economically sizable use of non-antidumping TTBs during the 1990s, most of which the result of the global safeguard. Like Argentina and Brazil, Turkey experienced a similar increase in the stock of its products covered by TTBs after its formation and phasing in of a customs union (with the European Union) came into effect after 1995, as well as implementation of its Uruguay Round WTO commitments. Both of these actions constrained Turkey's ability to unilaterally change its applied import tariffs and may have shifted any political pressure to impose new trade barriers onto previously unused TTB policy instruments.

China began using TTBs with its first antidumping case in 1997. Figure 2 indicates a steady, but moderate increase in products covered by its use of AD beginning shortly thereafter. The break in the trend for China is 2002-2003 when it, like the EU, followed the U.S. lead and imposed a global safeguard over a large number of imported steel products. The result was a spike to 4.49% of the stock of imports (by value) covered by TTBs in 2003. The trade-weighting in this case reflects a larger economic importance of these products in China's overall imports than the importance measured by the pure count of products of equation (1), which was 1.92% of all imported products in 2003.

Finally, consider the case of Mexico in figure 2. The dominant feature is how Mexico imposed antidumping barriers on imports from China covering more than 1000 HS-06 products (more than 21% of Mexico's imported products, see figure 2a) in 1993 at duties that reached as high as 533%, and these TTBs remained in place until they were finally removed in October 2008. However, because Mexico imposed such barriers *prophylactically* – i.e., 700 different HS-06 products with AD imposed in 1993 had *zero* imports from China in 1992 – cumulatively the 1000 HS-06 product imports from China covered less than 0.8% of Mexico's imports in 1992 (figure 2b). Despite the AD being imposed on what would become major product categories for Chinese exported products to the world by the late 1990s (e.g., textiles, clothing, footwear, toys, bicycles, electronics, and chemicals), in this instance the equation (2) approach of trade-weighting with 1992 import share data tends to underemphasize the amount of trade likely to be affected over time (figure 2b) relative to the *counts* approach.²⁰

²⁰ Mexico's use of antidumping against China in this instance was likely in anticipation of China's ultimate accession to the WTO (negotiations which began under the GATT in 1987) for which China's exporters would ultimately receive most-favored nation treatment under Mexico's tariff schedule. For an additional discussion, see de la Torre and Gonzalez (2005).

As such, the Mexican example is excellent motivation for my choice to report both the *count* measure of equation (1) and the *value* measure of equation (2), as they complement each other and thus can provide a more complete and accurate assessment of the economic importance of the economy's TTB use. As the Mexican case reveals, the count measure may be particularly important in my context of studying many developing economy users of TTBs, some of which may follow a strategy similar to Mexico and implement the TTBs prophylactically and before the arrival of substantial imports of particular Chinese products. This is a possibility given that each of the policy-imposing economies that I analyze heavily target imports from China, as I confirm in the data discussed in section 4 below.

Finally, note again that the top half of table 1 summarizes the data on the developing economy users of TTBs presented in figure 2.

2.3 Policy volatility and uncertainty

Thus far my discussion of figures 1 and 2 has focused primarily on each policy-imposing economy's "stock" measures of annual products subject to TTBs. Nevertheless, each of the figures also presents information on the annual "flow" of all TTBs (black *dashed* line) and antidumping alone (gray *dashed* line), as defined annually by products subject to newly initiated investigations. Table 2 summarizes the "flow" information from figures 1 and 2 for each of these economies.

[TABLE 2 HERE]

Before turning to the information on flows, I begin with column (1) of table 2, which documents (and orders policy-imposing economies by) the cumulative share of all HS-06 products that the economy imports that it subjected to at least one TTB investigation over the 1990-2009 period. The first country on the list is Mexico at 21.79%, which is not surprising given my discussion of the last section and Mexico's antidumping on imports from China covering 1993-2008 (figure 2a). Also not surprising for Mexico are columns (5) and (6), which show the annual average flow of products subject to new investigations over the 1997-2007 period as being quite close to zero. There was little underlying demand in the Mexican economy for more TTBs each year given that such a large share of Mexico's imported products were already subject to a TTB during the entire period. On the other hand, consider an economy like India (8.62%) with a smaller (although still sizable) cumulative share of total imported products that it had subjected to at least one TTB over the period. India had an average of 0.94% (0.50%) of imported products by count (value) being subject to new TTB investigations each year during

1997-2007. Its flow measure was much higher than Mexico because it built up its stock more slowly. And India is not alone as other economies like the U.S., EU, Turkey and Argentina each had flow measures that (by count) averaged more than 0.40% of imported products per year during 1997-2007.

Combined, these results suggest that a number of major economies in the WTO system may create substantial trade policy uncertainty for foreign exporters through the way they use TTBs. While applied tariffs are quite low in this period (especially in historical terms), many exporters experienced the possibility of a trade policy adjustment by being subject to a TTB investigation which had a reasonable chance of resulting in imposition of a new trade barrier.

Finally consider the table 2 data which examines flow information on potential new TTBs during the recent global economic crisis. In particular, columns (3) and (4) present information from 2009 on the investigations initiated in response to domestic industry petitions for new import protection. In 2009, 0.63% (0.50%) of U.S. imports by count (value) was subject to a new TTB investigation. This data is somewhat surprising given the historical context; at the time, there was a substantial fear that new import protection would result from the deep recession, as injured industries and high levels of unemployment would result in industry and labor unions placing demands for new barriers. However, the 2009 U.S. figures are well below the average annual share of imported products subject to new U.S. TTB investigations during 1997-2007, which is 1.01% (0.92%) by count (value). This pattern is similar for the EU, South Korea, Japan and South Africa – economies which all registered smaller flow measures (new investigations) in 2009 than their 1997-2007 annual (pre-crisis) averages. On the other hand, India (1.74% of imports, by count), Argentina (1.32%) and Turkey (0.80%) are countries for which the opposite is true. Each of these economies had substantially higher 2009 flows than their 1997-2007 averages. I further describe these and other notable 2008-2009 crisis trends in the data in more detail in section 3 below.

2.4 Policy coverage and focus on antidumping

Before turning to a more detailed discussion of the 2008-2009 crisis, I point to one last feature of table 2. Column (2) presents information on the extent to which each of the G20 economies was particularly reliant on antidumping, relative to its total cumulation of products that were affected by at least one TTB during the 1990-2009 period.

For economies like Mexico, South Africa, Australia and Canada – antidumping alone covered more than 98% of the products that they subjected to a TTB during this period. And while some countries may use multiple policies simultaneously – e.g., antidumping and a CVD against the same product from the same foreign export source at the same time, an issue to which I return in section 5 below – this affects the size of the trade barrier imposed (e.g., the height of the new tariff), not the scope of import product coverage affected by TTBs.

On the other hand, there are some economies for which a singular focus on antidumping misses much of the product coverage associated with TTB use during 1990-2009. Both the United States and EU, for example, had more than 10% of the products subject to some TTB during this period that was not antidumping. For China, it was over 40% of all TTB-affected products. For these three economies, I have already discussed the main cause of this in the context of figures 1 and 2; i.e., the 2002-2003 period in which these economies imposed global safeguards on a number of imported steel products. Nevertheless, other economies like Argentina, Brazil, Indonesia, and Turkey that were not part of the 2002-2003 steel safeguard imposing group also have sizable shares (10-30%) of TTB-affected products impacted from some policy other than antidumping. Despite India being the most frequent user of antidumping, because it is also a frequent user of safeguards and the China-specific safeguard, over 10% of its TTB-affected products were impacted by some policy other than antidumping.

3. The Global Economic Crisis of 2008-2009

The global recession of 2008-2009 served as a “stress test” to the institutional structure of the multilateral trading system. Previous to the crisis, countries had lowered their applied tariffs but established a set of provisions under the WTO which granted themselves policy flexibility through resort to TTBs in the case of unforeseen events, should the need arise. As of mid-2010, it is generally accepted that the aggregate response of the WTO system was that its members withstood the severe storm of uncertainty and economic trauma of the global crisis. Despite domestic economies going into recession, injured domestic industries, severely high rates of unemployment and political pressure for new import protection, there was not a major retreat toward raising applied tariffs, especially in ways that countries might have adopted in violation of their WTO commitments on tariffs (Kee, Neagu, and Nicita, 2010). Nevertheless, to the extent that these economies did respond with new policy initiatives, they turned to either the TTB policies that are my focus, to stimulus packages and bailouts (issues to which I return in section 5 below), or to some other non-tariff barriers.

The last section began to describe some of the TTB policymaking during the crisis, illustrating heterogeneity in terms of which countries experienced higher flows of imported products subject to new TTB investigations. One question is whether the countries with small flows also had relatively high *pre-crisis* stocks of products covered by previously imposed TTBs. For a number of the major developed economies in figure 1, I can quickly rule out this explanation. Their pre-crisis trends had resulted in relatively low shares of imported products subject to the stock of TTBs in place prior to the crisis in 2007.

Consider figure 3, which illustrates the data cumulated across G20 policy-imposing economies on the *combined* stocks of imported products subject to TTBs over the period 1997-2009, using the *count* method of measurement defined in equation (1).²¹ Figure 3a illustrates that, by the end of 2009, the G20 economies had increased the stock of imported products they subjected to imposed TTBs by 25.42% relative to pre-crisis levels of 2007 (*black solid line*). In 2009, 2.15% of HS-06 products that the G20 economies imported were now subject to a TTB, having increased from 1.88% of imported products prior to the crisis in 2007. And for all the media attention focused on policies such as the China-specific transitional safeguard (used by the U.S. over imports of tires in September 2009), the vast majority of the increase in TTB product coverage came through antidumping (*black dashed line*).

[FIGURE 3 HERE]

Figure 3b further decomposes the black and gray lines of figure 3a – i.e., the stock and flow series based on all TTBs – into whether the policy-imposing economy was a developed or developing G20 member. The result shows that the main *source* of the overall increase in the stock of product coverage during the 2008-2009 crisis was new TTBs imposed by *developing* economies, which combined to have 40% more products subject to a TTB in 2009 (2.55% of their imported HS-06 products) than before the crisis in 2007 (1.71% of their imported HS-06 products). On the other hand, developed economies combined to have only 5% more products subject to a TTB in 2009 (1.71% of their imported HS-06 products) than before the crisis in 2007 (1.63% of their imported HS-06 products).

The second important point coming out of figure 3b is that it is difficult to rule out visually that the relative changes in the data between 2007 and 2009 are not simply part of a longer term trend in TTB use and thus are *unrelated* to the crisis. Put differently, it will be difficult to conclude that the 40% increase in developing economy product coverage subject to TTBs was *caused by* the crisis. Because of

²¹ For reasons described in section 2.2.2 above, Mexico is the only major G20 user of such policies not included in figure 3 (see again figure 2a).

the pre-crisis upward trend for developing economy users, the 40% increase may have taken place even under more “normal” macroeconomic conditions had the 2008-2009 crisis not occurred.

I address this question more closely in table 3. In addition to summarizing figure 3, table 3 also provides a breakdown, by policy-imposing G20 economy, of the increase in the stock of product coverage of TTBs between 2007 and 2009 using the method defined in both equation (1) [column (2)] and equation (2) [column (4)]. The economies are ordered in the table by which had the largest percentage change in TTB product coverage between 2007 and 2009 using the *count* method of equation (1). Three major emerging economies – India, Indonesia, and Argentina – lead the list with the largest increases in the stocks of products covered by TTBs during this period, again reflecting the information presented in figure 2.

[TABLE 3 HERE]

The main piece of new data presented in table 3 are economy-by-economy *forecasts* of the 2009 level of TTB coverage based on predictions from the historical data. Motivated by figure 3b, the thought experiment is simply to regress the 1997-2007 import share data on a linear time trend, use the estimated coefficient from the regression to *predict* the (out of sample) import share for 2009, and then to compare the prediction for 2009 with the realized data for 2009. I report in column (3) the prediction which uses the *count* import share defined in equation (1), and I report in column (6) the prediction which uses the *value* share defined in equation (2).

A table 3 comparison of column (2) with (3) and column (5) with (6) makes it difficult to conclude that the change in product coverage taking place between 2007 and 2009 is a substantial deviation from historical trends. First note that in columns (2) and (5), I make **bold** all realizations of the 2009 import share data that were *larger than* the 2009 predicted import share stemming from the simple linear regression model. According to the *count* measure, ten economies (five developing and five developed) had a larger share of 2009 imports become subject to TTBs than was predicted from the models. Only four economies (China, South Africa, Mexico and South Korea) had less product coverage in 2009 than was predicted. On the other hand, using the *value* measure of equation (2) and comparing column (5) with (6) gives different results; only six economies (two developing and four developed) had a higher-than-predicted share of 2009 imports become subject to TTBs. While these economies (India, Indonesia, Australia, Canada, U.S., Japan) did experience increases in the share of imported products subject to TTBs during the economic crisis (see column (4)), the simple linear time trend model predicted this. Therefore, under such an exercise it is only the small *difference* between the realized

2009 data and the 2009 forecast that is the unpredicted piece of new import protection that one could associate as being related to the crisis. Furthermore, according to column (6), Argentina actually experienced a smaller increase in imports covered by TTBs in 2009 than the model predicts based on a time trend alone – i.e., not controlling for any of the sizable macroeconomic factors during the recession which would make conditions even more likely for an increase in TTBs. And Turkey's *value* measure actually fell slightly (-9.25%) in 2009 compared to 2007 according to column (4), despite the model predicting a slight increase from the 2007 realized value.²²

Thus while there was an increase in import protection during the crisis – at least as measured by the stock of imported products subject to TTBs in 2009 being higher in 2007 – my interpretation of the preliminary evidence is that it is difficult to support a claim that the increase was *caused by* the crisis, given underlying, pre-crisis trends already apparent in the data.

4. Exporters and Foreign Use of Antidumping

Thus far I have addressed the question of TTB use from the perspective of the policy-imposing economies and the scope of their imported products likely to be affected by use of such policies over time. In this section I switch my focus to the *incidence* of such policies, and I ultimately take the perspective of the exporters directly and negatively impacted by imposed TTBs. Furthermore, in this section I restrict my attention to the antidumping policy instrument.

I structure this section in two parts.²³ In the first subsection, I examine the use of antidumping from the perspective of each G20 policy-imposing economy to identify trends and potential heterogeneity in the application of the policy across different categories of foreign export targets. In the second subsection, I re-orient the analysis to the perspective of the exporters themselves. This allows

²² The substantial difference between the realized import shares for Turkey in 2009 based on equation (1) and (2) merits an explanation. While Turkey increased (on net) the number of HS-06 products subject to TTBs in 2009 relative to 2007, the particular HS-06 products for which Turkey removed TTBs during this period were such a large share of imports that the value share measure of equation (2) declined slightly. The products were associated with Turkey's removal of antidumping barriers on sizable imports of steel billets from Russia, Ukraine and Moldova that had been in effect since 1995.

²³ In this section of the paper, and for reasons described in section 2.2.2 above, Mexico is the only major G20 user of such policies not included in the construction of data behind figures 4, 5, and 6 and table 5 discussed below (see again figure 2a).

me to examine the frequency with which their exported products are targeted by foreign use of antidumping over time.

4.1 Foreign targets and developed versus developing economy users of antidumping

Consider next figure 4, which presents cumulative annual G20 stocks of “counts” of the *combination* of HS-06 products and foreign trading partners affected by imposed antidumping barriers over time.²⁴ Here the figure splits the analysis into two groups of policy-imposing economies – figure 4a is the developed economy members of the G20, and figure 4b is the developing economy members. Each panel’s cumulative annual stock of product-trading partner combinations subject to antidumping is subsequently decomposed into three categories of exporting economy targets: China, other developing economies (non-China), and developed economies.

[FIGURE 4 HERE]

The first point to note with respect to both panels of figure 4 is that the cumulative stock of product- trading partner combinations subject to antidumping tracks the time trends of figure 3b (which includes TTB-affected products, but did not count affected trading partners) quite closely. Developed economy users of antidumping have seen their cumulative stock affected by antidumping fall over time, and the level in 2009 is well below the within-period peak of the previous 15 years, which took place around 2002-2003.²⁵ On the other hand, as of 2009, the developing economy users of antidumping are still adding to their stocks of product-trading partner combinations subject to antidumping.

²⁴ Construction of figure 4 uses a modified version of equation (1). Instead of examining counts of HS-06 products normalized by the set of the economy’s total imported HS-06 products, I construct the measure by using counts of *combinations* of HS-06 products and foreign trading partners. Furthermore, I report the measure as a simple count and not as a share of (say) the economy’s entire set of HS-06 imported product and foreign trading partner combinations. Specifically, whereas one HS-06 product would be counted once in equation (1) regardless of how many trading partners were simultaneously subject to an antidumping barrier over that product, in figure 4 the measure is adjusted by the number of trading partners subject to the barrier. For example, if the AD on one HS-06 product were imposed on three trading partners, this would receive an entry of three in the count measure used in figure 4.

²⁵ As I hint at elsewhere in the paper, this is a combination of two factors. First, there are fewer HS-06 products covered by the stock of imposed AD in 2009 than in earlier years. Second, the newest imposed AD on any given HS-06 product is more likely to be imposed on one foreign export source (e.g., China) than in the past, and especially with respect to the products being removed from the previous year’s “stock” after Sunset Reviews. Antidumping imposed over a 6-digit HS product in the 1990s or early 2000s (and thus the products where AD is being removed in the mid-to-late 2000s) were more likely to have been imposed against *multiple* foreign sources. The increase in rate of naming a single country (e.g., China) in AD cases rising over time has been previously noted in Bown (2010c).

Consider next the decomposition of which trading partners are affected by each policy-imposing group's use of antidumping. For the developed economy stock of imports that remains affected by antidumping, over time the incidence has increasingly shifted away from developed economy exporters and toward China and other developing economy exporters. Specifically compare 1997 with 2009. In 1997, 50% of the developed economy stock of AD was imposed against other developed economies, 11% was imposed against China, and 39% was imposed against other (non-China) developing economies. By 2009, developed economies imposed only 33% of the stock of AD against each other (developed economies), and by contrast 27% was imposed against China and 41% was imposed against other (non-China) developing economies. Table 4 summarizes the implications of figure 4, and it also presents this same data decomposition for each of the G20 policy-imposing economies individually.

[TABLE 4 HERE]

For the developing economies, the changing pattern to the exporter incidence of antidumping is even stronger. By 2009, not only are developing economies still adding to their stocks of product-trading partner combinations targeted by antidumping, but the incidence of this antidumping is increasingly concentrated on *other* developing economies' exports. Overall, 61% of antidumping use by developing economies targeted other developing economies in 2002, and this grew to 68% by 2009. There is also a trend within developing economies to increasingly focus their use of antidumping to specifically address imports from China: 34% of their antidumping use in 2009 was against China, and this is notably higher than both *developed* economy use against China in 2009 (27%) and what *developing* economy use against China was in 2002 (19%). Table 4 also illustrates the substantial heterogeneity in the exporter incidence across the policy-imposing economies. In 2009, Turkey, Brazil and India each targeted China with 40% or more of the stock of product – trading partner combinations that were affected by antidumping. The two notable exceptions to the trend in the increased concentration of antidumping targeting imports of China are Mexico (discussed in section 2.2.2 above) and Japan (a relatively small user of the policy overall).

Finally, for all of the attention focused on the United States use of antidumping, it is worth pointing out that China was affected by *only* 21% of the stock of product – trading partner combinations targeted by a U.S. antidumping barrier in 2009. This is the *lowest* share of all of the developed economy G20 members users of antidumping. Nevertheless, this figure for the U.S. has increased from 8% in 1997 and only 10% as late as 2002.

4.2 Antidumping from the exporter's perspective

While China and other developing economies are increasingly the target of the antidumping barriers that are in place, how important are such trade barriers from the perspective of their total exports? I.e., given that China and a number of other emerging economies have exports that have expanded considerably under both the intensive margin (increased growth in volumes of existing products) and extensive margin (entry into new product markets), use of antidumping may be but a nuisance and perhaps a small price they are willing to pay for trading partners' willingness to accommodate their overall export expansion.

To begin to address these questions, I re-orient the analysis and consider the perspective of the exporting economies that send their products to these G20 import markets that have been my focus thus far. I structure my empirical analysis around a simple modification of equation (1). Now instead of constructing measures of how antidumping trade barriers affect the share of the stock of an importing economy's total set of imported products, I focus on the share of the exporting economy's stock of exported products sent to the G20 that are subsequently subject to foreign (G20) use of antidumping.

Begin with figure 5, which presents my first results that focus on the G20 developing economies from their perspectives as exporters concerned with the share of their stock of exported products subject to foreign-imposed antidumping barriers. Each panel in the figure provides two series of data derived from a modified version of the count measure of equation (1). The black solid line starts with the total count of HS-06 exported products sent to the G20 *developing* economies (denominator) and reports the share of those products subject to a G20 developing economy-imposed antidumping barrier that year. The dashed line with circles starts with the total count of HS-06 exported products sent to the G20 *developed* economies (denominator) and reports the share of those products subject to a G20 developed economy-imposed antidumping barrier that year.

[FIGURE 5 HERE]

To interpret figure 5, consider the case of China's exports. Just prior to China's WTO accession in 2000, China's exports to developing and developed economies faced antidumping at about the same rate. Just under 1% of its exports to developing economies and just under 1% of its exports to developed economies were subject to antidumping barriers imposed by governments in those markets. Since the 2001 accession, an increasing share of China's exported product categories have been targeted by foreign antidumping, though the rate of increase of being targeted is much higher for its exports sent to developing economies. By 2009, 2.61% of all Chinese HS-06 products exported to other *developing*

economies were subject to a foreign antidumping barrier. The share of China's exports to developing economies that became subject to antidumping has nearly *tripled* in the ten years since 2000. On the other hand, only 1.55% of China's exported products to developed economies were subject to foreign antidumping by 2009.

It is also important to note that the rate at which China is increasingly being targeted with foreign antidumping is taking place despite China's continued export growth during this period, including its expansion into new markets. These are factors which would expectedly increase the *level* (number of instances) in which China is targeted with AD and is a measure that I report below in table 5. China has not only seen an increase in the level of instances hit with foreign antidumping, but it has also seen a rapid increase in the *share* of its overall exported product count that is being affected over time.

Turning away from China, there is substantial heterogeneity across the developing economy exporters as to how frequently they are being targeted with foreign antidumping over time. Figure 5 also illustrates how, for other G20 countries like Argentina, Brazil, Mexico, Russia and Turkey, both the share of exports to developed economies targeted by foreign antidumping as well as the overall incidence (the averages of the two series on each panel) have *fallen* dramatically. For other G20 economies like India, Indonesia and South Africa, there have been more recent *increases* to the share of overall exports that are being targeted by foreign antidumping. For these economies, most of this is driven by the antidumping imposed by other developing economy members of the G20. This is also further evidence of the growing concern that antidumping is increasingly a "South-South" phenomenon, and that developing economies face an increasing concern that TTB use erodes potential benefits of nondiscriminatory, most-favored-nation (MFN) treatment embodied in the WTO.

The second half of figure 5 provides the same information for other developing economy exporters which are (or have been) considerable targets of G20 antidumping, but which themselves are not members of the G20. Economies like Malaysia, Thailand, and Vietnam have seen considerable increases to the share of their exported products, especially to other developing economies, affected by antidumping. Economies like Kazakhstan and Ukraine are notable because there are years in which sizable shares of their exported products to developing economies are targeted by antidumping, heights reached more than 4% for Ukraine and nearly 14% for Kazakhstan. This is partially driven by the fact that these economies export few products overall to other developing economies.

Figure 6 presents the same basic information contained in figure 5 but from the perspective of the higher-income economies, a number of which were the major targets of antidumping in the 1980s

and 1990s. Overall, each of these exporting economies has seen a reduced share of its exports to other *developed* economies being targeted by foreign antidumping. For the antidumping barriers that remain on high-income economy exports, they increasingly stem from the policies imposed by developing economies. Nevertheless, even for the major developed economy exporters, the share of their exports to developing countries that is targeted by foreign antidumping is much smaller than what confronts China, for example, as well as some other developing economy exporters.

[FIGURE 6 HERE]

Table 5 summarizes and expands upon the results of figures 5 and 6. First note the ordering of the exporting economies is by the count of product- trading partner combinations in which their exports were subject to a foreign antidumping barrier in 2009.²⁶ As already indicated, China's exports are first on the list, with nearly four times as many product-foreign market combinations being subject to antidumping in 2009 as the next most targeted group of economies (South Korea; EU; Taiwan, China). Two other features of the data that also separate China from these high-income economy exporters is that the *share* of China's exports to developing (column 2) *and* developed (column 4) economies that is being targeted is much higher, and China faces a higher rate of growth at which the targeting of its exports has been increasing over time. While figures 5 and 6 illustrate this over a longer time horizon, columns (3) and (5) report the growth between 2007 and 2009 of the share of the exporting economy's exported products that are being target by foreign antidumping, as imposed by developing and developed trading partners especially. For China, the share of exported products to developing countries subject to antidumping grew by 48% between 2007 and 2009, and the share of exported products to developed countries subject to antidumping grew by 30%.

[TABLE 5 HERE]

Column (3) reveals that developing economy exporters such as India, Thailand, Indonesia and Vietnam share another common tie with China – i.e., substantial growth in the share of their stock of exported products to *developing* economy trading partners becoming subject to TTBs during the crisis. China's increased coverage of 48% between 2007 and 2009 was surpassed by the increases facing Thailand (57%) and Indonesia (64%) and followed by India (46%) and Vietnam (23%). South Korea (22%) and the United States (21%) also saw substantial increases in the share of their exported products to developing economies become subject to foreign antidumping during the crisis, though, in the case of

²⁶ Again to be clear, this is the stock of products subject to antidumping barriers in effect in 2009 and *not* only the barriers that were newly imposed in 2009.

the United States, it started from a much lower baseline share of affected exports in 2007 relative to most of these other economies.

5. Countervailing Duties and Subsidies Before and After the Crisis

The rules governing the use of countervailing duties allow the imposition of new trade barriers to offset the allocation of foreign government subsidies to firms that export products that subsequently injure import-competing industries in another market. Like the antidumping law, economists have questioned the implementation of CVD provisions into trade agreements like the WTO, as well as trade agreement rules limiting the national imposition of subsidies more broadly (Bagwell and Staiger, 2006; Ruta, Brou, and Campanella, 2009). Regardless of whether use of or rules governing CVDs are economically sensible, understanding the extent of CVD use is economically important.

Furthermore, a number of recent political-economic events coincided to increase the likelihood that CVD use is on an upward trend. First, the 2007 U.S. reversal of its mid-1980s *Georgetown Steel* decision has resulted in a policy shift so that the U.S. now accepts domestic petitions to apply CVDs against imports from China. After more than twenty years of refusing to consider imposition of CVDs against imports from non-market economies, the change resulted in the United States applying duties on Chinese imports after 17 separate investigations between 2007 and 2009. Second, a number of other WTO member economies have also either recently implemented new CVD legislation thus expanding their TTB policy arsenal (India, China, Turkey), or they have joined the United States and also started to use CVDs against China after having previously declined to do so (Australia, Canada, European Union). Third, given that many economies have now decided that they should no longer tie their hands regarding CVD use against China, the longstanding concern with the relative valuation of China's currency and allegations that it acts as an implicit export subsidy may also fuel increased CVD use.²⁷ Fourth, the 2013-2014 expiration of the China-specific transitional safeguard, as well as China's non-market economy (NME) status under antidumping may restrict how much discretion countries have to use *other* TTB policies against China's exports and thus push policymakers to use alternative TTB instruments like CVDs. Fifth, the 2008-2009 crisis resulted in a number of major WTO members bailing out sizable domestic industries, and the Global Trade Alert (Evenett, 2009) documents dozens of examples of such subsidies with the potential for negatively impacting foreign commerce since

²⁷ Staiger and Sykes (forthcoming) provide a notable critique of the hypothesized link between China's exchange rate undervaluation and export subsidization, and whether any such link could be addressed through CVDs.

November 2008. The Global Trade Alert lacks comparable data on bailouts and subsidy packages from *before* the crisis to assess whether the identification of 2008-2009 subsidies is any more or less than previous use. Nevertheless, based on anecdotal evidence of the CVD response after earlier financial crisis (e.g., multiple economies imposing CVDs on sizable imports of Korean semiconductors after the Korean bailout of Hynix during to the Asian crisis), there may be cause to expect more CVD use after the 2008-2009 crisis as well.²⁸

Figures 7a and 7b illustrate the use of CVDs over 1990-2009 by the United States and all other G20 policy-imposing economies, respectively. Once again, the figures adopt the equation (1) approach to using “counts” of HS-06 products to measure the share of imported products subject to the TTB (in this case the CVD) over time. However, I define the data series of interest differently from the earlier figures, based on my observation of how CVDs are being used in practice. In a number of economies, policymakers use CVDs *simultaneously* with antidumping. E.g., the government initiates a simultaneous investigation under both its AD and CVD law of firms from the same foreign country over imports of the same HS-06 product, responding to a domestic industry’s allegation that it has been injured by dumped imports that also received GATT/WTO-illegal foreign government subsidies. Figures 7a and 7b each present four pieces of information. In each panel of the figure, the *black solid* line represents the annual stock of products subject to a CVD. The *black dashed* line represents the annual stock of products subject to a CVD that are *not* also subject to a simultaneous antidumping action – i.e., where the CVD policy is not “redundant” (in product-trading partner coverage, though not necessarily in terms of the size of the duty imposed, an issue I do not address here). Similarly, the *gray solid* and *gray dashed* lines reflect the annual *flow* of products subject to all CVD investigations and only those CVD investigations without simultaneous antidumping, respectively. There are two main sets of implications to draw from figure 7.

[FIGURE 7 HERE]

First, CVDs have a larger scope of import product coverage in the United States relative to the other G20 policy-imposing economies. In 2009, more than 2% of the stock of U.S. imported HS06 products (by count) were subject to imposed CVDs, and this share has remained relatively constant since

²⁸ Indeed, China’s first CVD case was against the United States over Grain-Oriented Electrical Steel (GOES) alleges injurious subsidies in “Buy America” provisions associated with the 2009 U.S. stimulus package.

the 1990s (figure 7a).²⁹ The combined use of the other G20 economy users of CVDs is much smaller – even despite the recent (well-publicized) increase in policy activity, less than 0.2% of these other G20 economies’ HS-06 imported products in 2009 were subject to imposed CVDs (figure 7b).³⁰

Second, in both the United States and in the broader use amongst the other CVD-imposing economies in the G20, there is strong evidence of the simultaneous use of CVD alongside antidumping. It is relatively rare for a product to be subject to a CVD and not also be subject to antidumping.³¹ This point has obvious important implications for potential TTB policy reform and for attempts to address the removal of TTBs through WTO dispute settlement. For example, any attempt to rein in TTB use by addressing antidumping or CVDs alone will overestimate the likely impact if the reform fails to account for the policy substitutability and redundancy. The removal of AD may have little market access impact on trade flows if it does not also remove the simultaneously imposed CVD, and vice versa.

6. Conclusions and New Directions for Research

This paper examines the evolving, cross-country use of temporary trade barriers (TTBs) – antidumping, safeguard, and countervailing duty policies – over the period 1990-2009. I construct new measures of annual, product-level stocks and flows of these TTBs with newly available data drawn from the World Bank’s *Temporary Trade Barriers Database*.

I benchmark trends in historical use and establish a number of facts regarding use of the TTB policies in order to measure any changes in import protection taking place during the global economic crisis of 2008-2009. I find that the 2008-2009 economic shock mostly accentuates patterns already visible in the pre-crisis data. While the major G20 users of such policies combined to increase the stock

²⁹ Once again, because I define the measures consistently over time, measurement error at the HS-06 level is much less of a concern for the main questions of interest on the *intertemporal* changes (i.e., whether the scope of imported products subject to U.S. use of CVDs or TTBs is increasing or decreasing over time). See again the discussion in section 2.1.

³⁰ Furthermore, the United States has been and remains the dominant user of countervailing duties. While not shown in the figure, I can also confirm that the United States was responsible for roughly 50% of the stock of entire HS-06 products that the G20 imported that were subject to CVDs during this period. The other G20 economies combined to contribute the other 50%. The other G20 users of CVD (shown in the lower panel of figure 7) are Argentina, Australia, Brazil, Canada, China, EU, India, Japan, Mexico and Turkey. According to the WTO, South Africa also has some use of CVDs but I am unable to identify the HS-06 product codes associated with its use and due to lack of publically available information details on this use are not included in Bown (2010a).

³¹ It is important to note, however, that the converse is not true, as most use of antidumping by the economies in my sample of data is not accompanied by a simultaneous CVD.

of product-lines subject to TTBs by 25% during the crisis, most of this is the result of developing economies that combined to increase their stock of product coverage by 40%. Perhaps surprisingly, high-income economies increased their stock of products affected by TTBs by only 5% during the crisis.

Furthermore, these changes during the global economic crisis are consistent with pre-crisis trends in the data on TTB use. Developing countries have been increasing their use of TTBs prior to the crisis at such a rate that it is difficult to claim empirically that the 2008-2009 crisis *caused* developing economies to increase their stock of TTBs above what the simple time trend would predict even in the absence of a major global recession. On the other hand, the U.S. and EU have reduced the stock of imported products they subject to TTBs by up to 50% over the last fifteen years, which is consistent with the crisis data, indicating a muted response to political calls for new TTBs.

Also significant are the trends in the data from the perspective of the exporting economies. By 2009, China had roughly four times as many products subject to foreign-imposed TTBs as the second most-targeted economies. Furthermore, the share of China's exports to other *developing* economies is subject to much more foreign-imposed TTBs than its share of exports to developed economies, and it is also growing at a faster rate. My evidence confirms that this particular feature is not unique to China but is shared by a number of other major developing economy exporters, thus deepening the concern that such discriminatory trade barriers are increasingly a "South-South" phenomenon.

Finally, I conclude by commenting on how the lack of a substantial increase in new import protection resulting from the 2008-2009 crisis beyond that predicted from pre-crisis data raises important questions for research. If the world trading system does ultimately escape the 2008-2009 crisis relatively unscathed with respect to new and extraordinary protectionist initiatives, an open and fundamentally important question is, why?

The facts that I have generated from the use of TTBs during the 2008-2009 crisis suggest many potential contributing causes that should form the basis for future research. One possibility is that the WTO system's architecture was well constructed to handle the crisis. I.e., perhaps by having a system in place which allowed for TTB use, domestic political pressure for new trade barriers was allowed to escape via a "safety valve." These nontrivial, though relatively small (in product coverage terms) increases in import protection could have prevented greater market-closing forces from emerging and the overall multilateral system from falling apart. On the other hand, the lack of a major protectionist response may be unrelated to WTO rules. It could be the result of the nature of the political economy of trade policy changing in a way which actually makes the WTO redundant (Blanchard, forthcoming).

With the proliferation of foreign direct investment and global supply chains, perhaps the traditional model of import-competing industries lobbying for protection is less important, as firms are not only import-competing, but they also rely on imports for components, they export, and they are thus substantially more exposed and invested in keeping markets open. Further still, perhaps there was a role played by preferential trade agreements in dampening the incentive to impose new trade barriers. Policymakers may have known that with PTAs, the most accessible forms of new import protection might not even benefit domestic import-competing industries, but instead PTA partners through trade diversion. Finally, it could also be the case that the developed economies with resources to implement fiscal stimulus and industry bailouts used alternative (and arguably more efficient than trade policy) subsidy policies to address the political pressure that, in earlier eras, may have resulted in new trade barriers. These are but a few of the many potential explanations that should be subject to further the research scrutiny needed to explain the facts raised by the data presented here.

Finally, notwithstanding the insights generated by the crisis, the data on heterogeneity in TTB use across countries and over time, combined with the current trading system of low average applied tariffs reveals the need for more research. What are the implications for the theory of trade agreements (Bagwell and Staiger 1990, 1999; Maggi and Rodriguez-Clare 1998, 2007) and the design of liberal trade “exceptions” embodied in their rules? Furthermore, the data reveal exporter incidence of the imposed TTBS to be extensive *discriminatory* treatment, especially in the form of “South-South” protection, and this raises a number of questions for the world trading system and the role of MFN treatment in particular (Ludema and Mayda, 2009). Perhaps at the forefront is the question of whether the resulting patterns of discriminatory protection embodied in TTBS enhance or reduce existing differences in tariff treatment that were caused by prior negotiated preferential trade agreements (Limão, 2006; Estevadeordal, Freund and Ornelas, 2008). Furthermore, there is also the causal question of whether the changing economic incentives induced by preferential trade agreements themselves change the scope of how TTBS are applied.

Data Appendix

Detailed data on antidumping, countervailing duties, global safeguards and China-specific safeguards are available from the World Bank's *Temporary Trade Barriers Database* (Bown, 2010a). For antidumping and countervailing duty policies, the data in Bown (2010a) are derived from original government source documents. Each government reports tariff-line product codes that are subject to the investigations, the dates and countries from whom imports are being investigated, and the decisions of whether to impose preliminary and final trade barriers, as well as when they are removed. The data on use of global safeguards and China-specific safeguards are derived from both original government source documents and what they report to the WTO's Committee on Safeguards. Bown (2010a) provides a complete discussion of the data sources, as well as the other information contained in the database that is not utilized in the analysis here.

The tariff line product codes from Bown (2010a) are then matched to bilateral import data at the 6-digit Harmonized System (HS) product-level is taken from Comtrade via WITS. The following countries had missing years of import data at the HS-06 level: Argentina (1990-1992), China (1990-1991), Japan (2009), South Korea (2009), USA (1990) and South Africa (1990-1991). The "value" share measures derived throughout the paper are based on non-oil import data only.

Because the composition of the European Union changes over the 1990-2009 period and I am especially interested in recent changes to EU change policy against non-members, I define the European Union as being made up of the EU-27 member countries throughout the entire sample. Given that definition, I focus on extra-EU imports and I drop all EU trade policy actions against other (even eventual) EU member states during the time period. For example, an EU antidumping case against Romania in 2002 would be dropped from the sample, since Romania eventually became part of the EU27 in 2007.

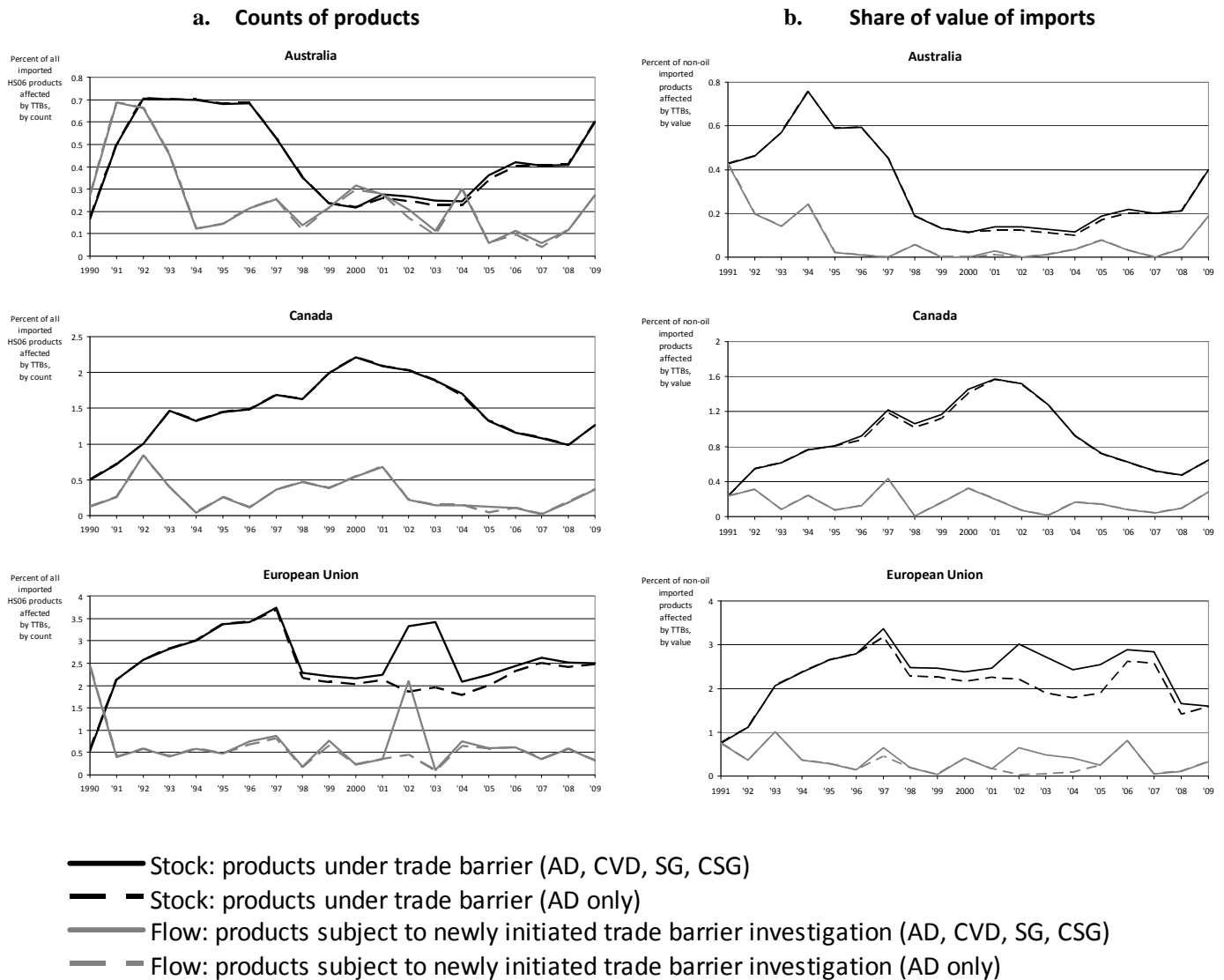
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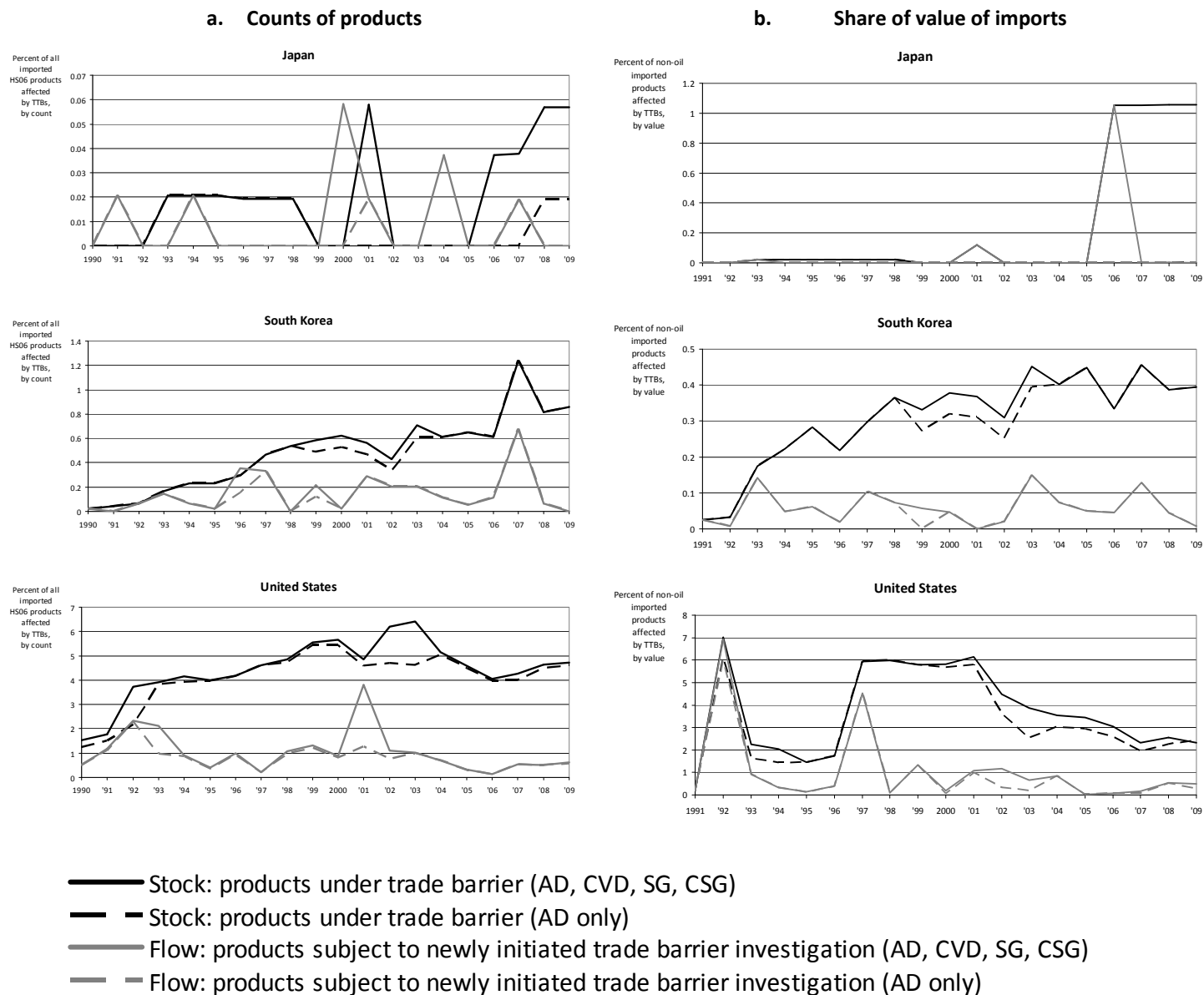
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Figure 1. Developed (G20) Economy Use of Temporary Trade Barriers, 1990-2009



Source: Calculated using equation (1) [panel a] and equation (2) [panel b] from data in the Temporary Trade Barriers Database (Bown, 2010a).

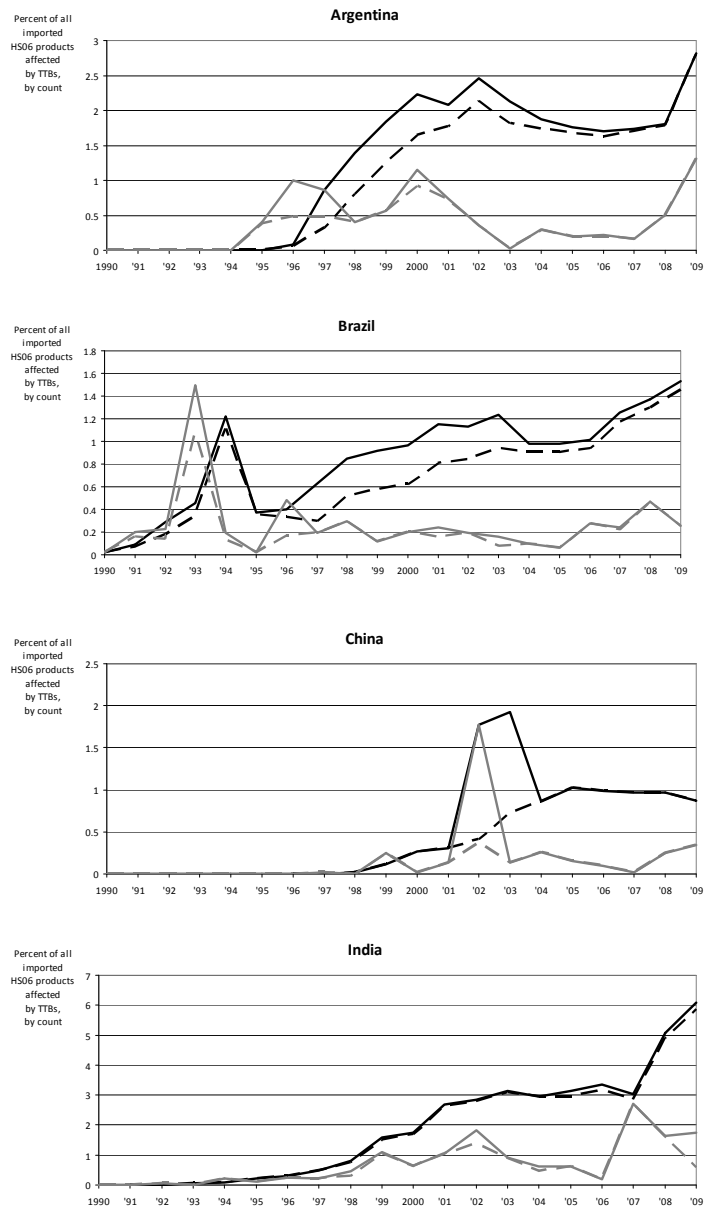
Figure 1. Developed (G20) Economy Use of Temporary Trade Barriers, 1990-2009 (cont.)



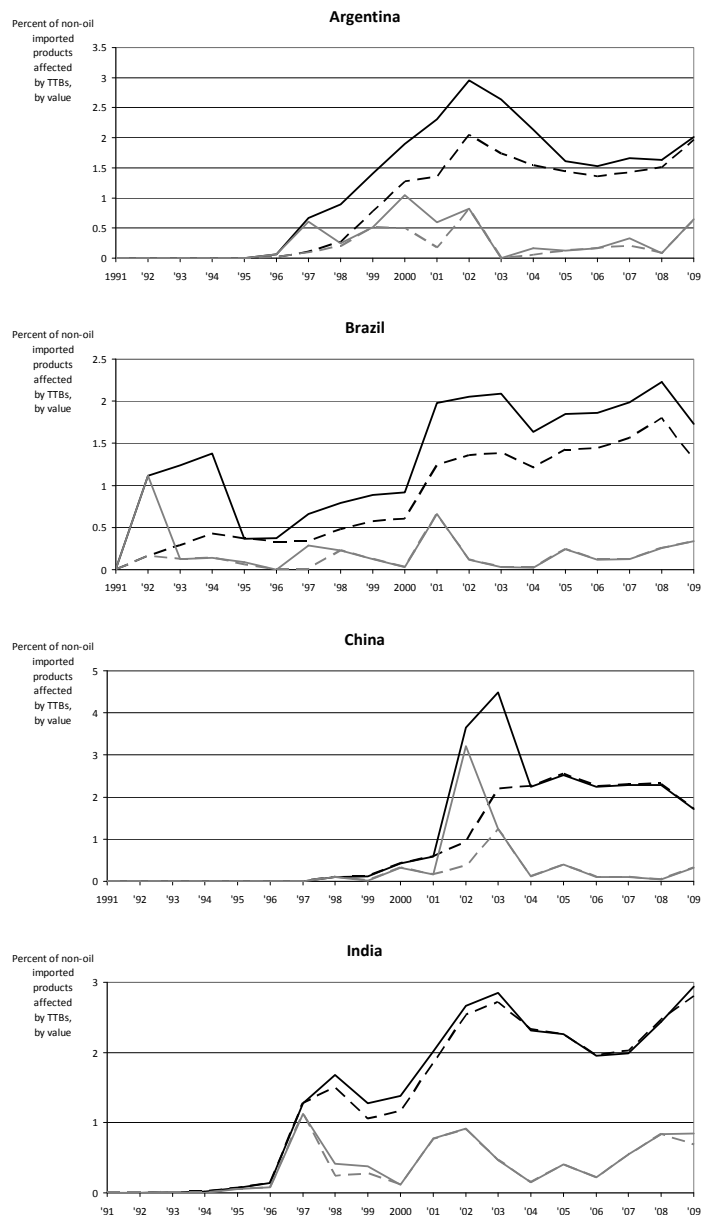
Source: Calculated using equation (1) [panel a] and equation (2) [panel b] from data in the Temporary Trade Barriers Database (Bown, 2010a).

Figure 2. Developing (G20) Economy Use of Temporary Trade Barriers, 1990-2009

a. Counts of products



b. Share of value of imports

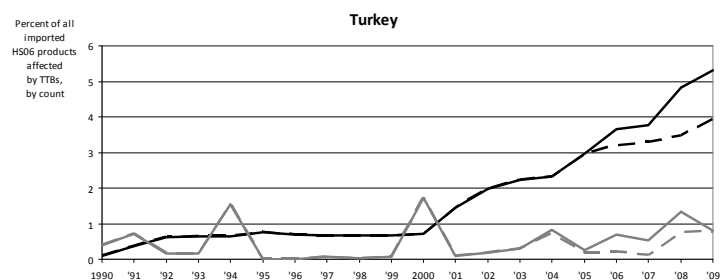
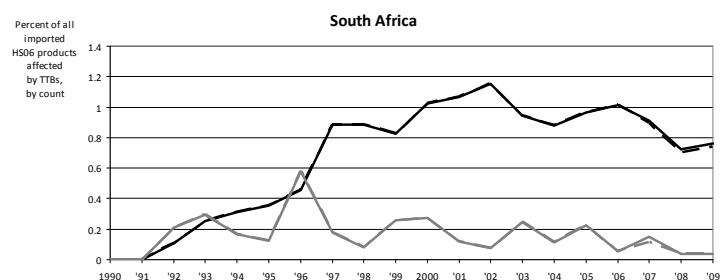
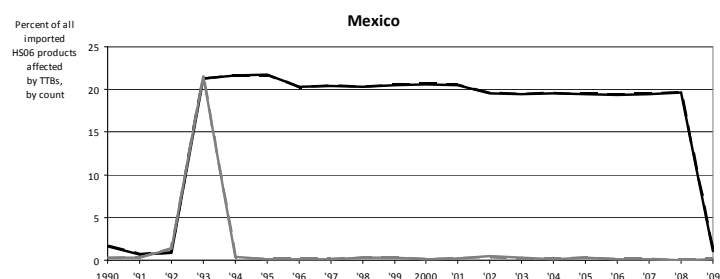
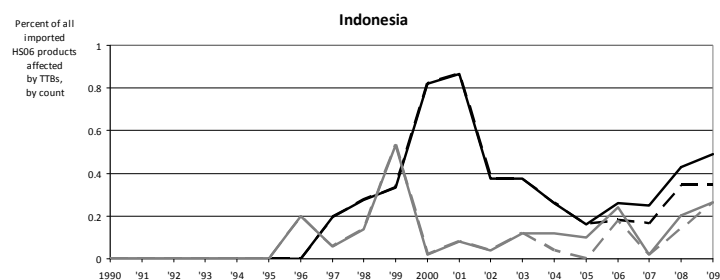


- Stock: products under trade barrier (AD, CVD, SG, CSG)
- - Stock: products under trade barrier (AD only)
- Flow: products subject to newly initiated trade barrier investigation (AD, CVD, SG, CSG)
- - Flow: products subject to newly initiated trade barrier investigation (AD only)

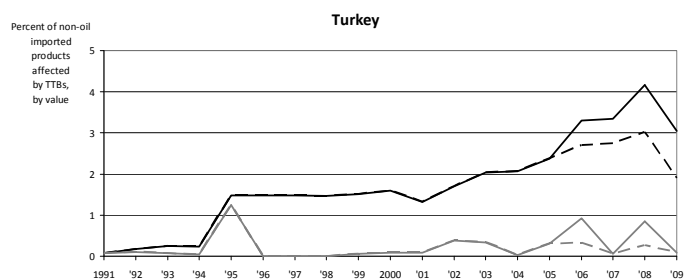
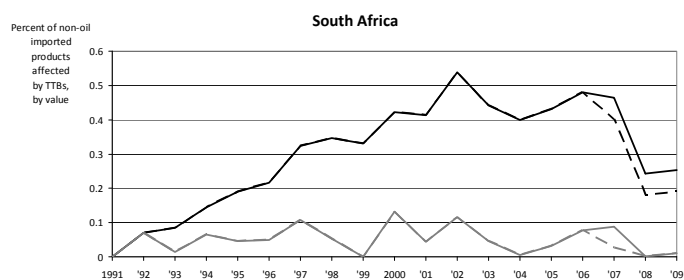
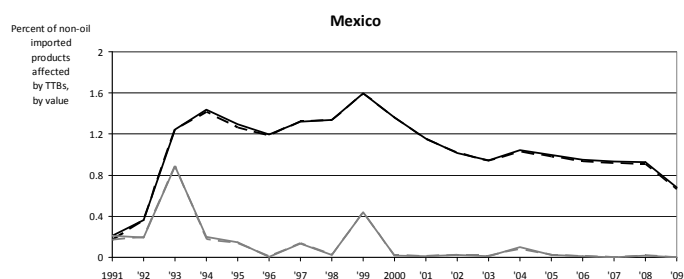
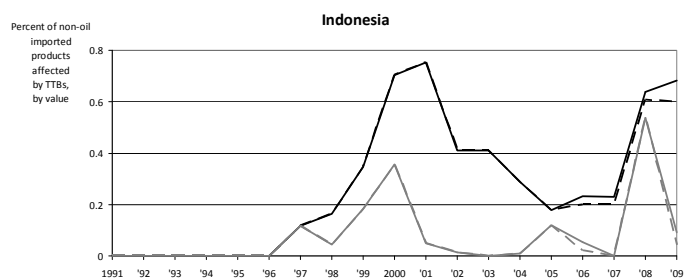
Source: Calculated using equation (1) [panel a] and equation (2) [panel b] from data in the Temporary Trade Barriers Database (Bown, 2010a).

Figure 2. Developing (G20) Economy Use of Temporary Trade Barriers, 1990-2009 (cont.)

a. Counts of products



b. Share of value of imports

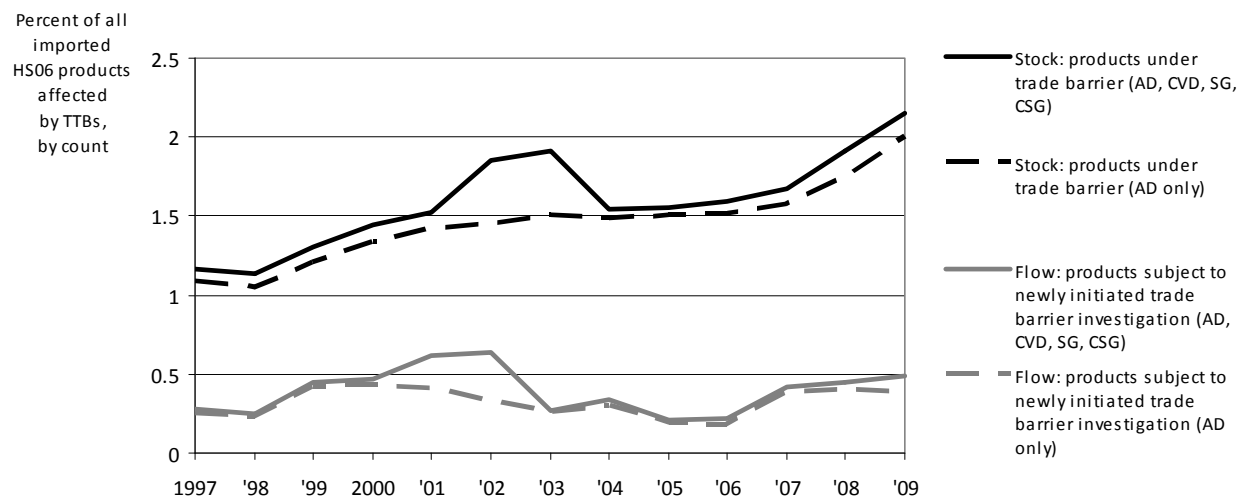


- Stock: products under trade barrier (AD, CVD, SG, CSG)
- - Stock: products under trade barrier (AD only)
- Flow: products subject to newly initiated trade barrier investigation (AD, CVD, SG, CSG)
- - Flow: products subject to newly initiated trade barrier investigation (AD only)

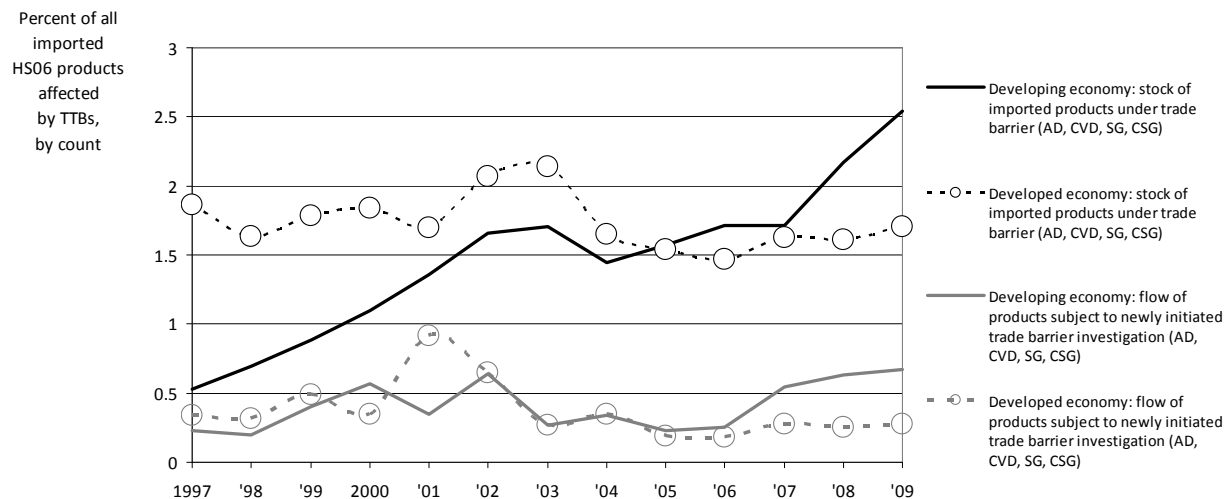
Source: Calculated using equation (1) [panel a] and equation (2) [panel b] from data in the Temporary Trade Barriers Database (Bown, 2010a).

Figure 3. Combined G20* Use of Temporary Trade Barriers, 1997-2009

a. Stock and flow for aggregate G20, all TTBs versus AD only



b. Stock and flow of products subject to all TTBs, developed versus developing economy imposers

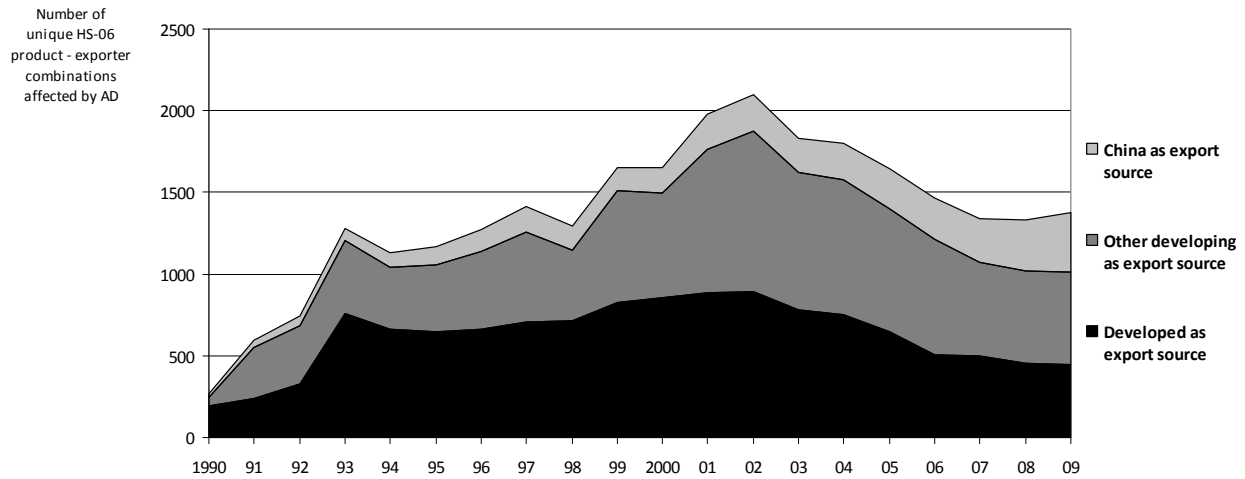


Source: Calculated using a modified version of equation (1) from data in the Temporary Trade Barriers Database (Bown, 2010a).

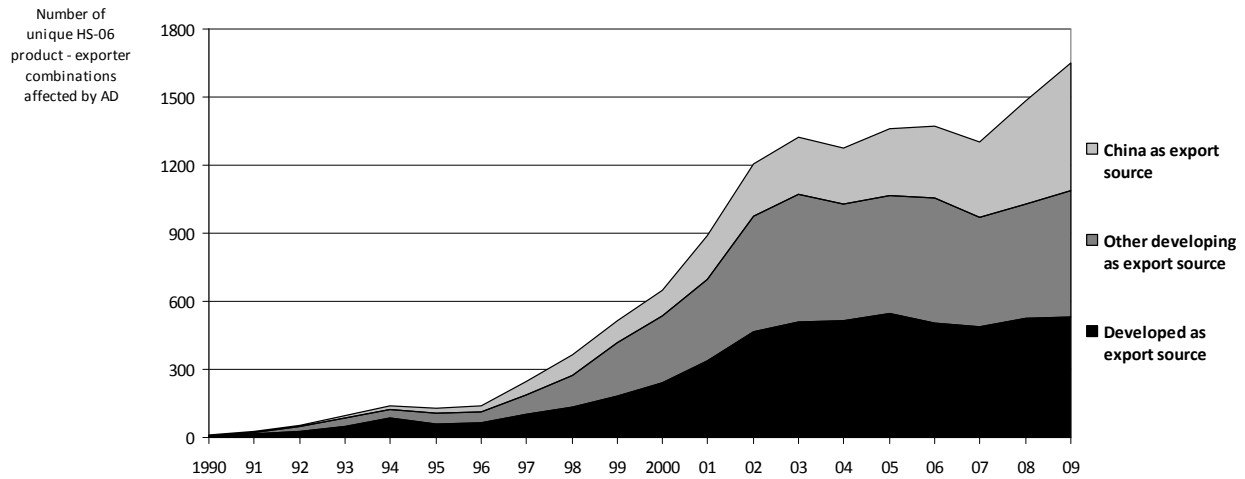
*The data is aggregated over the following thirteen G20 policy-imposing economies: Argentina, Australia, Brazil, Canada, China, the European Union, India, Indonesia, Japan, South Africa, South Korea, Turkey, and the United States. Mexico is the only major G20 user of such policies not included in construction of the data for the figures, for reasons explained in the text (see also figure 2).

Figure 4. Exporters Affected by G20 Use of Antidumping

a. Antidumping stock imposed by developed* (G20) economies, 1990-2009

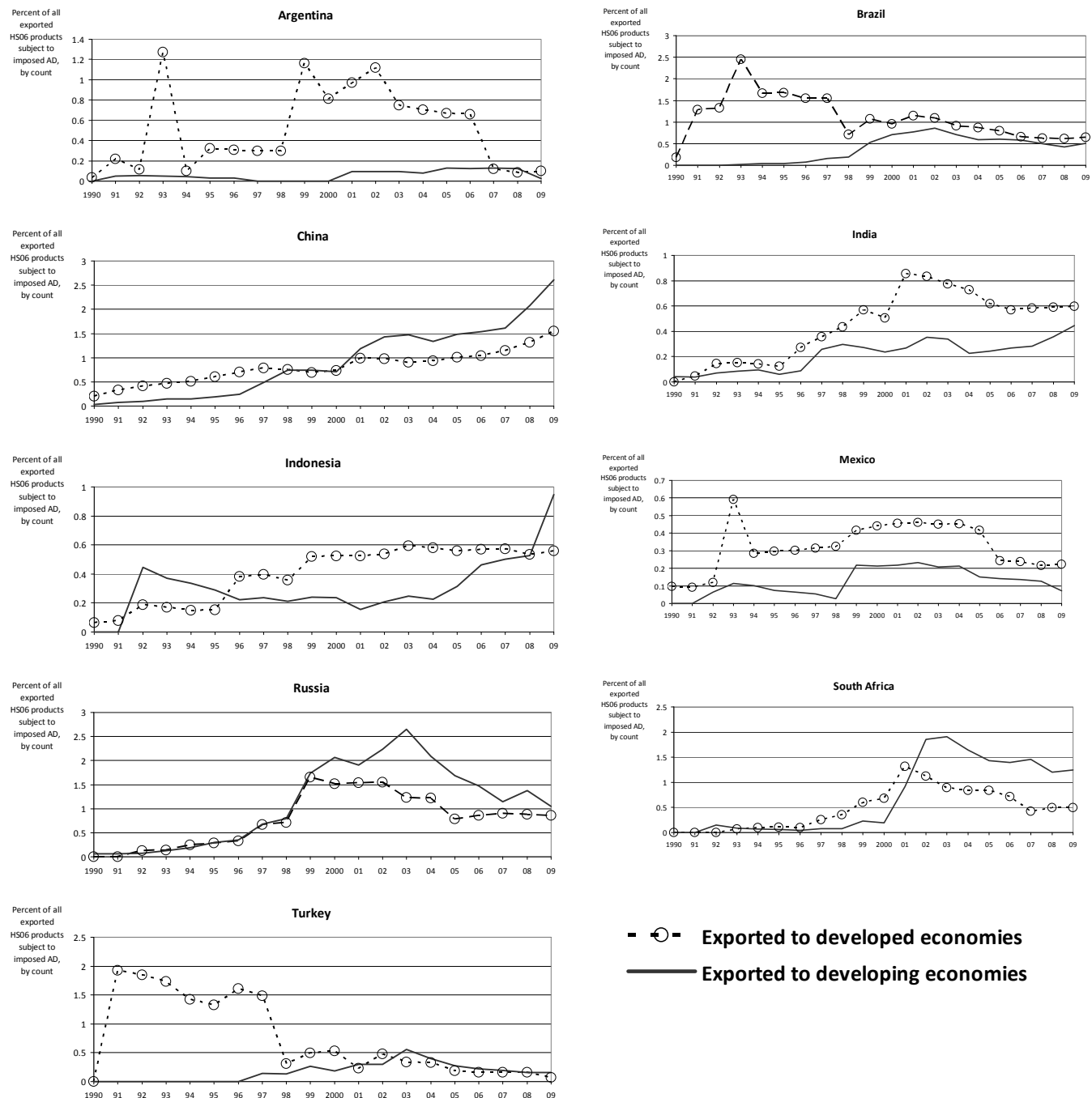


b. Antidumping stock imposed by developing* (G20) economies, 1997-2009



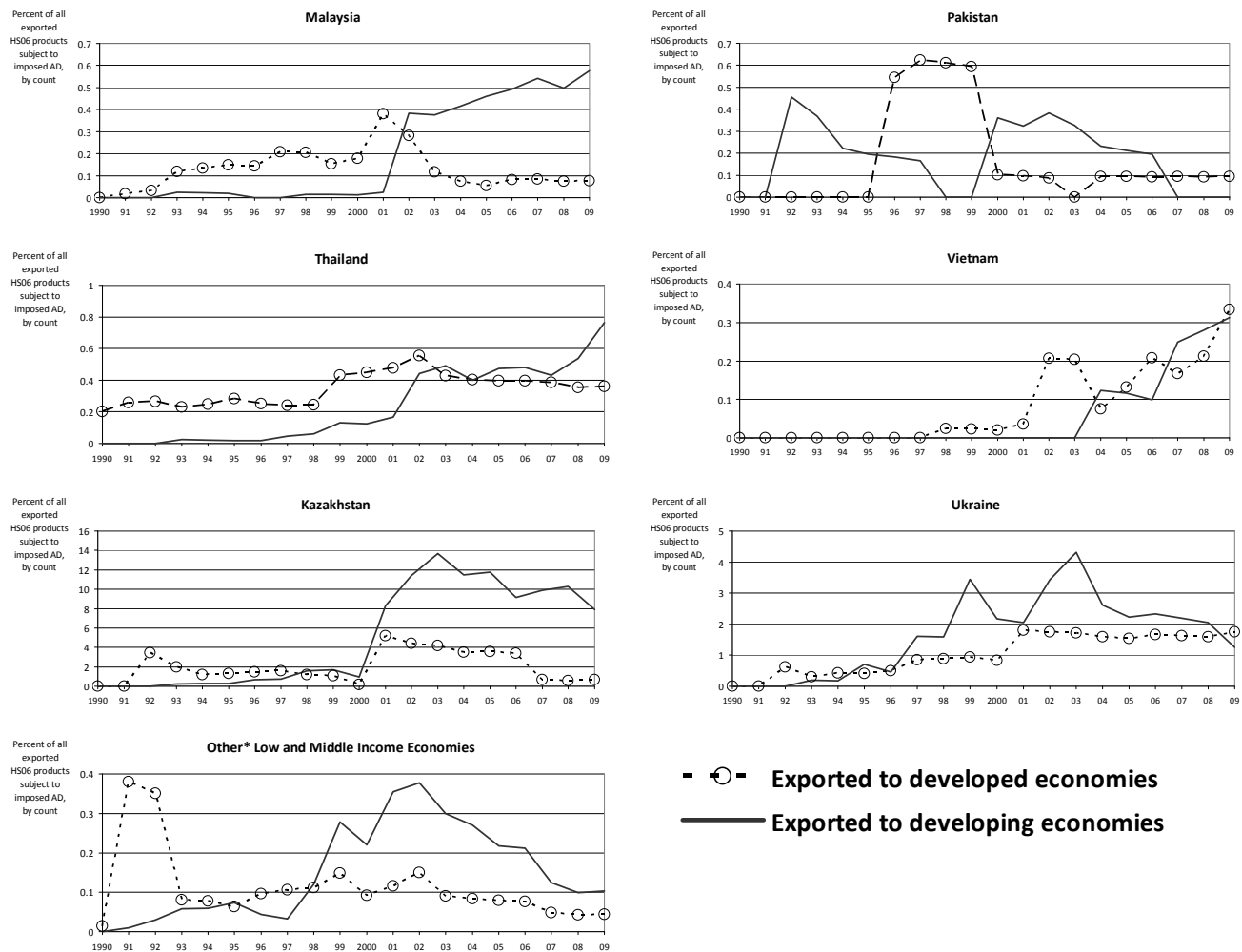
Source: Calculated using a modified version of equation (1), in which I focus only on the numerator (dropping the denominator), using data in the Temporary Trade Barriers Database (Bown, 2010a). The figures illustrate the annual count of importing country-product-exporting country target combinations affected by the imposition of antidumping. *The policies are separately aggregated over six developed G20 economy users (Australia, Canada, European Union, Japan, South Korea, and United States) and seven developing G20 economy users (Argentina, Brazil, China, India, Indonesia, South Africa, and Turkey). Mexico is the only major G20 user of such policies not included for reasons described in the text (see again figure 2).

Figure 5. Developing (G20) Economy Exports and Foreign Antidumping, 1990-2009



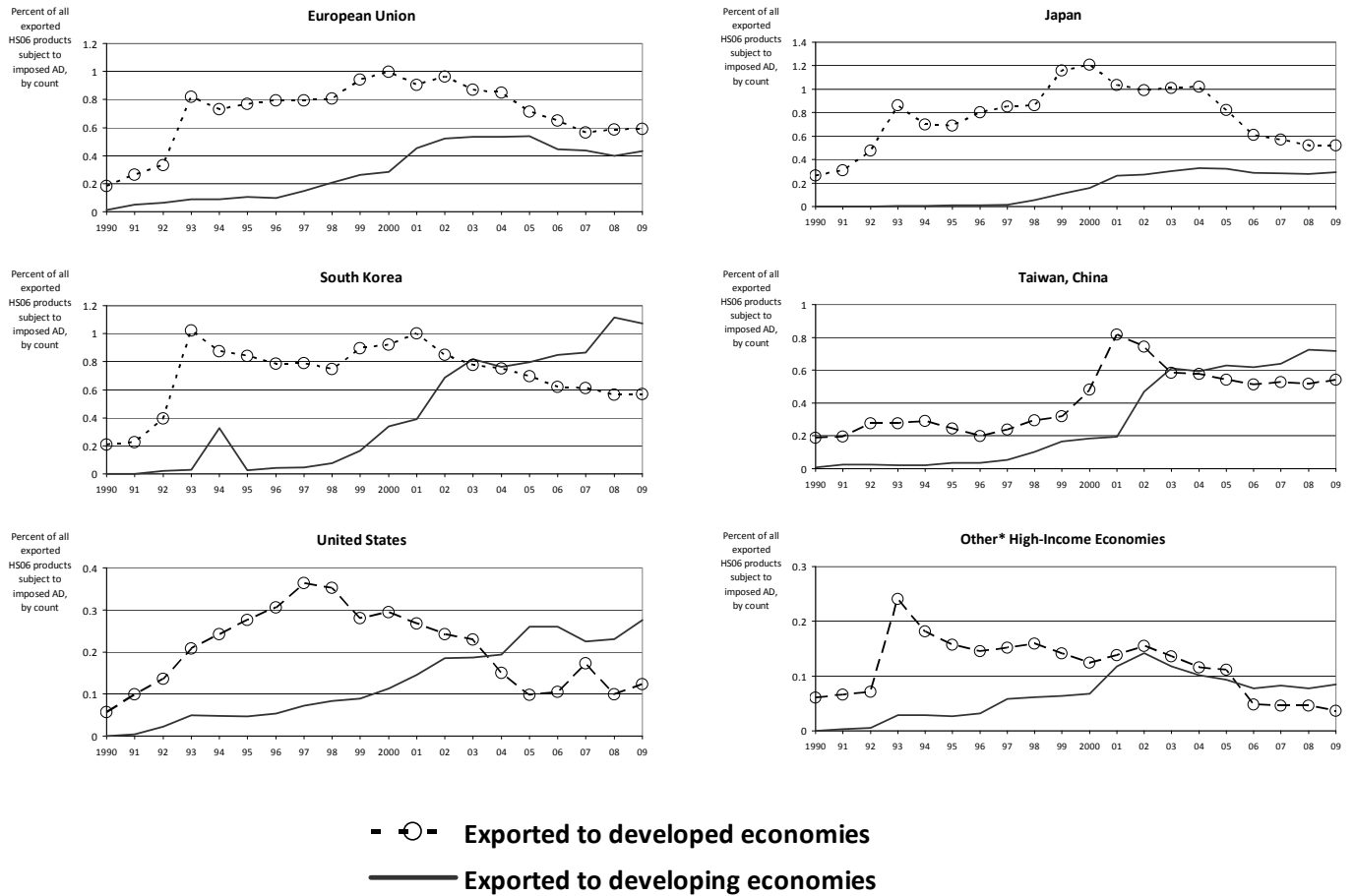
Source: Calculated using a modified version of equation (1) with data in the Temporary Trade Barriers Database (Bown, 2010a). The figures illustrate the number of importing country-product combinations affected due to the use of antidumping aggregated over the following G20 economies: seven developing (Argentina, Brazil, China, India, Indonesia, South Africa, and Turkey) and six developed (Australia, Canada, the European Union, Japan, South Korea, and the United States). Mexico is the only major G20 user of such policies not included in construction of the data for the figures, for reasons explained in the text (see also figure 2).

Figure 5. (cont) Developing (non-G20) Economy Exports and Foreign Antidumping, 1990-2009



Source: See source notes to figure 5. *Other includes Albania, Algeria, Armenia, Azerbaijan, Bangladesh, Belarus, Bosnia and Herzegovina, Chile, Colombia, Cote d'Ivoire, Costa Rica, Cuba, Dominican Republic, Ecuador, Egypt, Georgia, Iran, Kyrgyz Republic, Macedonia, Malawi, Moldova, Nepal, Nigeria, Paraguay, Peru, Philippines, Sri Lanka, Uruguay, and Venezuela.

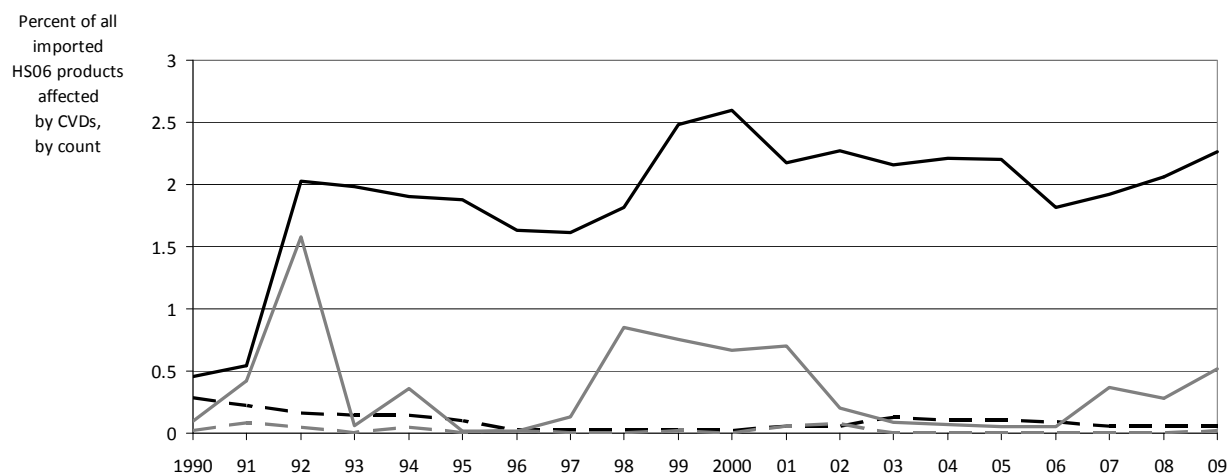
Figure 6. Developed Economy Exports and Foreign Antidumping, 1990-2009



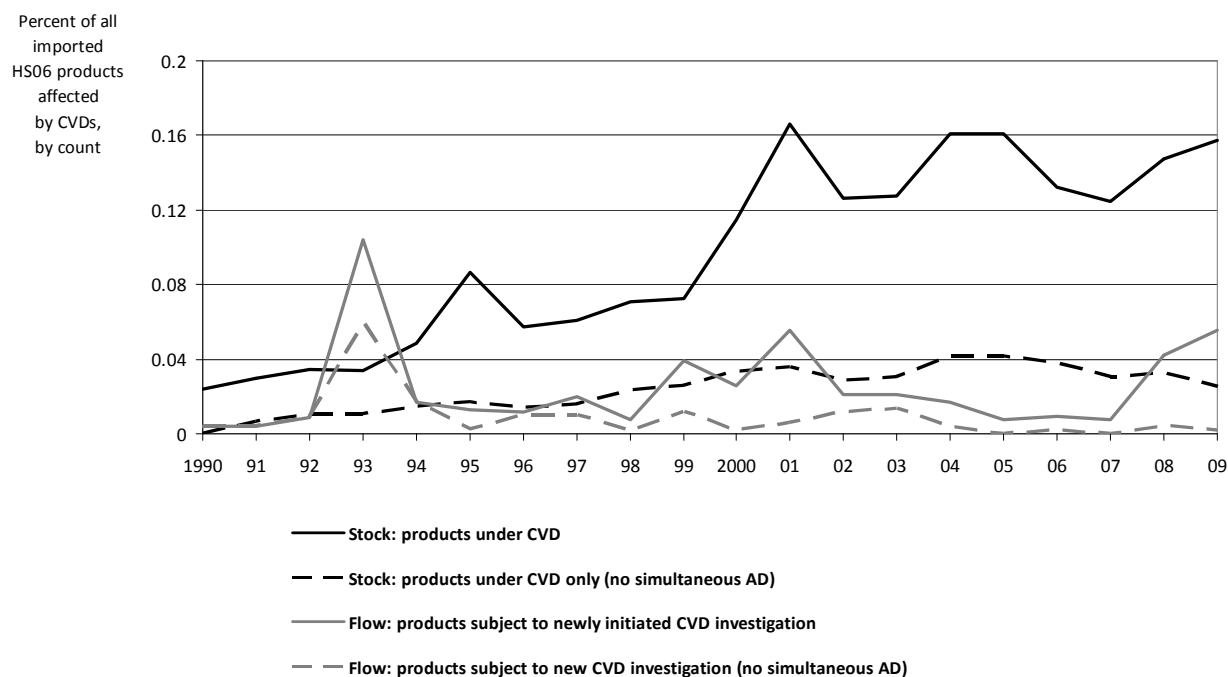
Source: See source notes to figure 5. *Other includes Australia, Canada, Croatia, Hong Kong SAR, China; Israel, Kuwait, Macau SAR, China, Norway, Oman, Qatar, Saudi Arabia, Singapore, Trinidad and Tobago, and United Arab Emirates.

Figure 7. G20 Use of Countervailing Duties (with and without AD), 1990-2009

a. United States



b. Other* G20 Users



Source: Calculated using a modified version of equation (1) from data in the Temporary Trade Barriers Database (Bown, 2010a). *The data is aggregated over the following ten other G20 economies: Argentina, Australia, Brazil, Canada, China, the European Union, India, Japan, Mexico, and Turkey. The only major G20 user of CVDs not included in the figure is South Africa, for data availability reasons.

Table 1. G20 Economies' Annual Stock of Imports subject to TTBs, 1997-2009

G20 Economy Imposer (ranked by column 3)	Count of HS-06 products subject to TTB (1)	2009		1997-2007			
		Import share, by count (2)	Import share, by value (3)	Average annual import share, by count (4)	Average annual import share, by value (5)	Minimum annual import share, by value (6)	Maximum annual import share, by value (7)
Developing economies							
Turkey	273	5.31	3.05	1.92	2.02	1.32	3.35
India	308	6.09	2.94	2.34	1.97	1.27	2.85
Argentina	139	2.81	2.01	1.82	1.79	0.67	2.96
Brazil	78	1.53	1.73	1.01	1.52	0.66	2.09
China	46	0.87	1.71	0.75	1.70	0.00	4.49
Mexico	58	1.09	0.68	19.91	1.15	0.93	1.59
Indonesia	24	0.49	0.68	0.38	0.35	0.12	0.75
South Africa	40	0.76	0.25	0.96	0.42	0.32	0.54
High income economies							
United States	256	4.72	2.33	5.11	4.58	2.33	6.14
European Union	137	2.50	1.59	2.62	2.69	2.38	3.37
Japan	3	0.06	1.06	0.02	0.21	0.00	1.05
Canada	69	1.27	0.64	1.71	1.10	0.52	1.57
Australia	31	0.60	0.40	0.32	0.18	0.11	0.45
South Korea	39	0.86	0.39	0.64	0.38	0.30	0.46

Source: compiled by the author from the Temporary Trade Barriers Database (Bown, 2010a), imports data from *Comtrade*. Columns (2) and (4) are computed using equation (1) and columns (3), (5), (6) and (7) use equation (2).

Table 2. Cumulative TTB Policy Coverage Over Time and Policy Volatility, 1990-2009

G20 Economy Imposer (ranked by column 1)	1990-2009		2009		1997-2007			
	Cumulative share of imported products ever subject to a TTB, by count (1)	Share of TTB- subjected products affected by AD, by count (2)	Annual flow of import share, by count (3)	Annual flow of import share, by value (4)	Average annual flow of import share, by count (5)	Average annual flow of import share, by value (6)	Minimum annual flow of import share, by value (7)	Maximum annual flow of import share, by value (8)
Developing economies								
Mexico	21.79	100.00	0.06	0.00	0.20	0.07	0.00	0.44
India	8.62	89.42	1.74	0.85	0.94	0.50	0.11	1.13
Turkey	6.63	71.95	0.80	0.09	0.43	0.21	0.00	0.92
Argentina	4.94	90.59	1.32	0.65	0.45	0.42	0.00	1.05
Brazil	3.80	80.09	0.26	0.34	0.19	0.18	0.02	0.66
China	2.74	59.75	0.34	0.32	0.26	0.52	0.00	3.21
South Africa	2.34	100.00	0.04	0.01	0.16	0.06	0.00	0.13
Indonesia	1.31	77.63	0.27	0.09	0.13	0.09	0.00	0.36
High income economies								
United States	13.37	84.94	0.63	0.50	1.01	0.92	0.02	4.53
European Union	9.62	87.30	0.33	0.33	0.63	0.37	0.04	0.81
Canada	3.70	98.60	0.37	0.28	0.29	0.15	0.01	0.43
Australia	3.24	98.40	0.27	0.19	0.19	0.02	0.00	0.08
South Korea	2.44	89.44	0.00	0.01	0.20	0.07	0.00	0.15
Japan	0.09	0.00	0.00	0.02	0.01	0.11	0.00	1.05

Source: compiled by the author from the Temporary Trade Barriers Database (Bown, 2010a), imports data from *Comtrade*. Columns (3) and (5) are computed using equation (1) and columns (4), (6), (7) and (8) use equation (2).

Table 3. The Crisis: Predicted vs. Realized G20 Economies' Stocks of Imposed Temporary Trade Barriers in 2009

G20 Economy Imposer (ranked by column 1)	Percent <i>change</i> in 2009 import share relative to pre-crisis 2007 level, by count (1)	2009 import share, by count (2)	<i>Predicted</i> 2009 import share, by count (3)	Percent <i>change</i> in 2009 import share relative to pre-crisis 2007 level, by value (4)	2009 import share, by value (5)	<i>Predicted</i> 2009 import share, by value (6)
Total	25.42	2.15	1.88	--	--	--
Developing economy total	39.75	2.55	2.14	--	--	--
India	69.69	6.09	4.28	39.14	2.94	2.62
Indonesia	67.25	0.49	0.26	108.69	0.68	0.29
Argentina	48.01	2.81	2.12	18.66	2.01	2.36
Turkey	34.39	5.31	4.36	-9.25	3.05	3.35
Brazil	20.03	1.53	1.27	-13.57	1.73	2.49
China	-10.03	0.87	1.65	-28.75	1.71	3.91
South Africa	-18.54	0.76	1.00	-60.57	0.25	0.51
Mexico	-287.94	1.09	18.98	-31.81	0.68	0.76
High income economy total	4.90	1.71	1.60	--	--	--
Japan	40.68	0.06	0.02	0.44	1.06	0.79
Australia	39.64	0.60	0.33	69.17	0.40	0.12
Canada	15.68	1.27	1.19	21.04	0.64	0.59
United States	10.17	4.72	4.63	0.11	2.33	1.80
European Union	-4.98	2.50	2.37	-58.04	1.59	2.66
South Korea	-36.39	0.86	0.92	-14.33	0.39	0.45

Source: compiled by the author from the Temporary Trade Barriers Database (Bown, 2010a), imports data from *Comtrade*. Column (2) is computed using equation (1) and column (5) uses equation (2). Predictions for 2009 in columns (3) and (6) are generated from coefficient resulting from regression of 1997-2007 annual import share data (from columns (2) and (4), respectively) on a linear time trend.

Table 4. The Shifting Incidence of G20 Economies' Annual Stock of Imports Subject to Antidumping

G20 Economy Imposer (ranked by column 1)	Against China (1)	2009 Against other developing (2)	Against developed (3)	Against China (4)	2002 Against other developing (5)	Against developed (6)	Against China (7)	1997 Against other developing (8)	Against developed (9)
Developing economies**	34.10	33.62	32.28	19.19	42.28	38.54	24.10	34.54	41.37
Turkey	48.25	33.96	17.79	46.53	27.72	25.74	12.50	43.75	43.75
Brazil	46.08	26.47	27.45	17.50	40.00	42.50	23.81	38.10	38.10
India	39.76	21.88	38.37	16.58	34.18	49.23	25.64	25.64	48.72
South Africa	33.90	45.76	20.34	20.15	42.54	37.31	24.10	15.66	60.24
Argentina	21.93	55.56	22.51	6.83	64.16	29.01	50.00	27.27	22.73
Mexico	20.00	40.00	40.00	94.05	2.47	3.48	90.63	3.71	5.66
Indonesia	18.18	56.06	25.76	19.30	61.40	19.30	22.22	77.78	0.00
China	na	15.91	84.09	0.00	15.22	84.78	na	na	na
High income economies	26.78	40.86	32.37	10.62	46.71	42.67	10.84	39.24	49.93
Australia	44.19	20.93	34.88	8.33	50.00	41.67	10.00	28.57	61.43
European Union	42.39	42.80	14.81	15.54	57.77	26.69	14.90	72.57	12.53
South Korea	29.33	29.33	41.33	21.74	17.39	60.87	20.00	8.57	71.43
Canada	26.50	44.02	29.49	9.65	51.54	38.81	8.15	17.39	74.46
Japan	25.00	25.00	50.00	na	na	na	100.00	0.00	0.00
United States	20.80	41.59	37.61	9.89	43.27	46.84	8.19	24.73	67.07

Source: compiled by the author from the Temporary Trade Barriers Database (Bown, 2010a) and computed using equation (1). **Not including Mexico as a policy-imposing economy, for reasons described in the text (see again figure 2).

Table 5. Exporters' Products Subject to Stock of G20*-Imposed Antidumping barriers, 2009

Exporting Economy (ranked by column 1)	Count of HS-06 product – G20 import market <i>combinations</i> subject to AD (1)	Share of all exported products to <i>developing</i> economies, by count (2)	Percent <i>change</i> in (2) relative to pre-crisis 2007 level (3)	Share of all exported products to <i>developed</i> economies, by count (4)	Percent <i>change</i> in (4) relative to pre-crisis 2007 level (5)
Developing economy exporters					
China	911	2.61	48.34	1.55	30.04
India	150	0.45	46.05	0.60	2.43
Thailand	137	0.76	56.91	0.36	-6.45
Indonesia	129	0.95	63.81	0.56	-2.04
Ukraine	107	1.25	-56.73	1.74	7.53
Brazil	107	0.51	3.14	0.65	4.41
Russia	97	1.05	-9.06	0.86	-5.63
South Africa	91	1.24	-15.77	0.50	15.03
Malaysia	68	0.58	6.13	0.08	-8.81
Vietnam	48	0.31	23.00	0.33	69.31
Kazakhstan	38	7.94	-22.14	0.66	-3.13
Mexico	31	0.07	-64.79	0.22	-6.24
Turkey	17	0.16	-16.39	0.07	-82.08
Argentina	6	0.03	-158.99	0.10	-18.57
Pakistan	5	0.00	0.00	0.09	-0.22
Other developing	59	0.10	-18.51	0.04	-6.87
High income economy exporters					
South Korea	247	1.07	21.60	0.57	-7.26
European Union	222	0.43	-1.31	0.59	4.55
Taiwan, China	201	0.72	11.33	0.54	2.60
Japan	139	0.29	3.61	0.52	-9.51
United States	91	0.28	20.68	0.12	-33.39
Other high income	85	0.09	2.93	0.04	-23.60

Source: Calculated using a modified version of equation (1) from data in the Temporary Trade Barriers Database (Bown, 2010a). The table documents the number of importing country-product combinations affected due to the use of antidumping aggregated over the following G20 economies: seven developing (Argentina, Brazil, China, India, Indonesia, South Africa, and Turkey) and six developed (Australia, Canada, the European Union, Japan, South Korea, and the United States). Mexico is the only major G20 user of such policies not included in the computation of the data used to construct the table, for reasons described in the text (see again figure 2).